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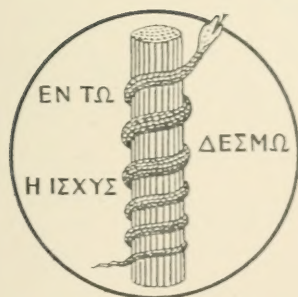
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1914



MEDICAL EDUCATION IN SCOTLAND.

According to the Regulations of the General Medical Council, a candidate for a medical qualification must (1) pass a preliminary examination; (2) register as a medical student; (3) study for five years at a recognised school; (4) obtain a degree or diploma; and (5) place his name on the *Medical Register*. No person whose name is not on the *Register* may legally sign certificates, give medical evidence in Courts, or sue for fees.

The following degrees and diplomas are available in Scotland—Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.), conferred by the Universities. Doctor of Medicine (M.D.) and Master of Surgery (Ch.M.) are higher qualifications conferred only on those who already hold the M.B., Ch.B.

The *Triple Qualification* (L.R.C.P.E., L.R.C.S.E., L.R.F.P.S.G.) is conferred by the two Royal Colleges and the Royal Faculty jointly. The Fellowships, Memberships, and Licences of these Corporations may also be registered as higher or additional qualifications.

Special degrees and diplomas in public health are also granted by the Universities and Corporations.

THE UNIVERSITIES.

PRELIMINARY EXAMINATION.—Before commencing his course of medical study each student shall pass a preliminary examination in (1) English, 2 Latin, 3 Mathematics, and (4) an additional language—Greek, French, German, Italian, or such other as the Senatus shall approve. In the case of a candidate whose native language is other than English, an examination in another classical language—*e.g.*, Sanskrit or Arabic—may be substituted for Latin, and an examination in the candidate's native language may be substituted for the additional language. A student must pass all the subjects at not more than two examinations. A degree in Arts or Science of any recognised University exempts from the preliminary, and certain other examinations may be accepted as substitutes.

MATRICULATION.—Having passed the preliminary examination, the student must, within fifteen days after the commencement of the session, matriculate at the University and pay the fee, which is £1, 1s. for the whole year, 10s. 6d. for the summer session alone.

REGISTRATION.—Within fifteen days of commencing his studies he must register as a medical student. He must be not less than sixteen years of age, must have passed the preliminary examination, and must show that he has begun his medical studies.

THE CARNEGIE TRUST.—This Trust is prepared to pay the class fees of students (who have passed the *specified preliminary examination*) for all classes, whether attended within the Universities or in any of the Extra-Mural Schools. It is also prepared to pay the fees for the various special classes given by many of the Lecturers upon advanced and non-compulsory subjects. Applicants (1) must be over sixteen years of age; (2) must be of Scottish birth or extraction, or must have given two years' attendance after the age of fourteen at a school or institution under inspection of the Scottish Education Department; and (3) must be qualified by preliminary examination under the ordinances of the Scottish Universities Commission and the

regulations of the Joint Board of Examiners, to attend the classes for which payment of fees has been claimed. Schedules of application for admission to the benefit of the Trust are obtainable by written application to the Secretary of the Trust, 14 Hanover Street, Edinburgh.

UNIVERSITY OF EDINBURGH.

The University of Edinburgh offers many attractions to the student of medicine. The various departments are well equipped for purposes of teaching and research, and there are ample facilities for clinical instruction. The Royal Infirmary, the Royal Hospital for Sick Children, and the Royal Maternity Hospital are in the immediate vicinity of the University, while the Royal Asylum for the Insane, the Fever Hospital, and the various dispensaries can be reached within half an hour.

Students may attend one half of their classes in the Extra-Mural School, and are thus offered a choice of teachers on the different subjects of the curriculum.

An important agreement between the University and the Royal Infirmary has been reached by which the teaching resources of the latter are more fully available for University students than formerly. The agreement provides that all the senior members of the Infirmary staff (those in charge of wards) become University lecturers and examiners, while the assistant physicians and surgeons become University lecturers, and take a share in the clinical teaching. The clinical tutors also take a recognised place in University teaching, and their demonstrations are to be held at a morning hour instead of in the evening. There can be little doubt that the latter change gives the study of side-room work an enhanced value in the mind of the student.

Further changes which have greatly benefited teaching have been made in the Pathological Department. The Professor of Pathology has been appointed Pathologist to the Royal Infirmary.

A Chair of Bacteriology has been founded, and Dr. James Ritchie has been appointed its first occupant.

Since Bacteriology had previously been taught in the Pathological Department, arrangements have been made to provide accommodation for the Professor of Bacteriology in the Laboratory of the Royal College of Physicians, of which he is the Superintendent, until a University department is provided.

The social side of student life is provided for in many ways. The University Union, with a membership of 1500, has a fine debating-hall, libraries, reading rooms, billiard rooms, and a catering department.

The Royal Medical Society, founded in 1737, offers the student the advantages of a fine medical library and reading rooms, while in its spacious hall in Melbourne Place many whose names have since become famous have made their first essay in medical debate. The Australasian Club and South African Union are the headquarters of student patriots from these quarters of the world.

The Town and Gown Association provide a number of student residences, which are managed by a committee of the residents.

A full curriculum for women students, recognised by the University, is provided by the Edinburgh School of Medicine at Surgeons' Hall. Women students have their own union, halls of residence, and athletic field (see p. xii.).

Attendance on courses of instruction in the various special departments is now compulsory, and this has necessitated a rearrangement of the curriculum.

An important regulation has been introduced which has the effect of limiting a student's attendance on later subjects of the curriculum until he has passed the professional examinations on the earlier subjects.

Particulars regarding the curriculum will be found in the University calendar or "medical programme," published by James Thin, 55 South Bridge.

It is recommended that students begin study in the summer session.
The curriculum is as follows:

FOR STUDENTS BEGINNING IN SUMMER

First Summer Term—

Botany	.	.	.	.	.	8-9
Zoology	.	.	.	.	.	12-1
Practical Botany	}	On alternate days				9-11
Practical Zoology						10-12
Practical Anatomy (thrice weekly)	.	.	.	.	.	Afternoon

(Examination in Botany and Zoology.)

First Year.

Winter (1st Term)—

Practical Chemistry (twice weekly)	.	.	.	.	.	9-11
Anatomy	.	.	.	.	.	11-12
Chemistry	.	.	.	.	.	12-1
Physics ¹	.	.	.	.	.	1-2
Practical Anatomy	.	.	.	.	.	Afternoon

Winter (2nd Term)—

Practical Chemistry (twice weekly)	.	.	.	.	.	9-11
Anatomy	.	.	.	.	.	11-12
Chemistry	.	.	.	.	.	12-1
Physics ¹	.	.	.	.	.	1-2
Practical Anatomy	.	.	.	.	.	Afternoon

(Examination in Chemistry and Physics.)

Summer Term—

Histology	.	.	.	.	.	8-10 or 11-1
Practical Anatomy.	.	.	.	.	.

Second Year.

Winter (1st Term)—

Physiology	.	.	.	.	.	10-11
Practical Physiology (twice weekly).	.	.	.	.	.	11-1
Practical Anatomy and Demonstrations.	.	.	.	.	.

Winter (2nd Term)—

Physiology	.	.	.	.	.	10-11
Practical Physiology (twice weekly).	.	.	.	.	.	11-1
Practical Anatomy and Demonstrations.	.	.	.	.	.

(Examination in Anatomy and Physiology.)

Summer Term—

Pathology (Practical) (thrice weekly)	.	.	.	.	.	8-10
Pathology (Morbid Anatomy)	.	.	.	.	.	10-11
Surgical Out-patients	.	.	.	.	.	11-12
Clinical Surgery	.	.	.	.	.	12-2
Practical Materia Medica	.	.	.	.	.	Evening Lectures

Third Year.

Winter (1st Term)—

Medicine	.	.	.	.	.	9-10
Pathology (Morbid Anatomy)	.	.	.	.	.	10-11
Clinical Medicine	.	.	.	.	.	11-1
Materia Medica	.	.	.	.	.	2-3
Pathology (including Elementary Bacteriology)	.	.	.	.	.	3-4

¹ Two classes of Physics are taught, the theoretical during the Winter Session.

*Winter (2nd Term) . .*Hour of Meeting
of Class.

Medicine	9-10
Pathology (Morbid Anatomy)	10-11
Clinical Medicine	12-1.30
Materia Medica	2-3
Pathology (including Elementary Bacteriology)	3-4

*(Examination in Pathology and Materia Medica.)**Summer Term—*

Out-patients (Medical)	11-1
Vaccination	3-4
Dispensary Practice	Afternoon

Fourth Year.*Winter (1st Term)—*

Surgery				9-10
Midwifery (including Gynecology)	.	.	.	10-11
* Sec. A. Diseases of Skin	}	11-12	Clinical Surgery	12-2
* „ B. Diseases of Eye				
* „ C. Diseases of Ear, etc.				
Dispensary Practice	}			Afternoon
Infectious Diseases (once weekly)				
Anæsthetics. ¹				
Optional Classes. ²				

Winter (2nd Term)—

Surgery				9-10
Midwifery (including Gynecology)	:	:	:	10-11
Sec. A. Diseases of Ear, etc.	}	11-12.	Clinical Surgery	12-2
„ B. Diseases of Skin				
„ C. Diseases of Eye				
Mental Diseases (twice weekly)				3-4
Infectious Diseases (if not previously attended)	}			Afternoon
Dispensary Practice				
Practical Midwifery				

Summer Term—

Operative Surgery	.	.	.	.	.	.	8-9.45
Public Health	.	.	.	.	.	.	10-11
Sec. A. Diseases of Children	.	.	.	.	.	.	11-1
„ B. Diseases of Ear, etc.	}	11-12.		Clinical Medicine			12-1.30
„ C. Diseases of Skin							
Forensic Medicine	.	.	.	.	.	.	2-3
Infectious Diseases (if not previously attended)	.	.	.	.	.	.	Afternoon

(Examination in Forensic Medicine and Public Health.)

¹ These Classes are held thrice weekly, and on alternate days Students must attend Clinical Surgery at 11 o'clock.

² Course of Instruction is given in each term.

³ Optional Courses are held in the subjects of *Winter Session* during the First Term of the Winter Session, twice weekly, 4 to 5 p.m., and may be attended by Students who have passed the 1st Professional Examination; *Clinical Methods in the Treatment of Diseases* during the First Term of the Winter Session, 4 to 5 p.m., twice weekly, and open to Students who have passed the 3rd Professional Examination; *Neurology* (daily at 4 p.m. during the Second Term of the Winter Session and open to Students who have passed the 3rd Professional Examination); *Applied Anatomy* (thrice weekly, from 5 to 6 p.m. during First Term of Winter Session, and Students are recommended to take the class in the Fifth Winter.)

Edinburgh

Fifth Year.

Winter (1st Term) —

Clinical Gynaecology	10-11
Sec. B. Diseases of Children	11-1
" A. Diseases of Eye 11-12	Clinical Medicine 12-1.30
" C. Clinical Medicine or Clinical Surgery	
Dispensary Practice	Afternoon
Practical Midwifery	
Optional Classes	

Winter (2nd Term) —

Clinical Gynaecology	10-11
Sec. C. Diseases of Children	11-1
Secs. A. and B. Clinical Medicine or Clinical Surgery	12-1.30
Dispensary Practice	(if not previously attended) Afternoon
Practical Midwifery	

Summer Term —

Clinical Work in Hospital.

(Examination in Midwifery, including Gynaecology, Surgery, and Medicine, and corresponding Clinical Practice.)

FOR STUDENTS BEGINNING IN WINTER.

First Year.

Winter (1st Term) —

Practical Chemistry (twice weekly)	2-11
Anatomy	11-12
Chemistry	12-1
Physics	1-2
Practical Anatomy (thrice weekly)	Afternoon

Winter (2nd Term) —

Practical Chemistry (twice weekly)	9-11
Anatomy	11-12
Chemistry	12-1
Physics	1-2
Practical Anatomy (thrice weekly)	Afternoon

(Examination in Chemistry and Physics.)

Summer Term —

Botany	8-9
Zoology	12-1
Practical Botany	9-11
Practical Zoology	10-12
Practical Anatomy	Afternoon

(Examination in Botany and Zoology.)

Second Year.

Winter (1st Term) —

Physiology	10-11
Practical Physiology (twice weekly)	11-1
Practical Anatomy	

Winter (2nd Term) —

Physiology	10-11
Practical Physiology	11-1
Practical Anatomy and Demonstrations	

Summer Term—

Hour of Meeting
of Class.
8-10 or 11-1

Histology	
Practical Materia Medica.	
Practical Anatomy and Demonstrations.	
<i>(Examination in Anatomy and Physiology.)</i>	

Third Year.*Winter (1st Term)—*

Medicine	9-10
Pathology (Morbid Anatomy)	10-11
Clinical Medicine	11-1
Materia Medica	2-3
Pathology (including Elementary Bacteriology)	3-4

Winter (2nd Term)—

Medicine	9-10
Pathology (Morbid Anatomy)	10-11
Clinical Medicine	12-1.30
Materia Medica	2-3
Pathology (including Elementary Bacteriology)	3-4

Summer Term—

Pathology (Practical) (thrice weekly)	8-10
Pathology (Morbid Anatomy)	10-11
Clinical Surgery	12-2
Practical Materia Medica (if not previously attended).	
Vaccination	3-4

*(Examination in Pathology and Materia Medica.)***Fourth Year.***Winter (1st Term)—*

Surgery	:	:	:	:	9-10
Midwifery (including Gynecology)	:	:	:	:	10-11
Sec. A. Diseases of Skin	}	11-12	Clinical Surgery	}	12-2
„ B. Diseases of Eye					
„ C. Diseases of Ear, etc.					
Dispensary Practice	}				Afternoon
Infectious Diseases (once weekly)					
Anæsthetics.					
Optional Classes.					

Winter (2nd Term)—

Surgery			9-10
Midwifery (including Gynecology)			10-11
Sec. A. Diseases of Ear, etc.	} 11-12.	Clinical Surgery	12-2
„ B. Diseases of Skin			
„ C. Diseases of Eye			
Mental Diseases (twice weekly)			3-4
Infectious Diseases (if not previously attended)	}		Afternoon
Dispensary Practice			
Practical Midwifery			

Summer Term—

Operative Surgery	.	.	.	.	8-9.45
Public Health	.	.	.	.	10-11
Sec. A. Diseases of Children	.	.	.	.	11-1
.. B. Diseases of Ear, etc.	11-12.				Clinical Medicine 12-1.30
.. C. Diseases of Skin					
Forensic Medicine	.	.	.	.	2-3
Infectious Diseases (if not previously attended)	.	.	.	.	Afternoon

(Examination in Forensic Medicine and Public Health.)

Fifth Year.

Winter (1st Term) —

Clinical Gynecology	10-11
Sec. B. Diseases of Children	11-1
„ A. Diseases of Eye 11-12. Clinical Medicine	12-1.30
„ C. Clinical Medicine or Clinical Surgery	
Dispensary Practice }	Afternoon
Practical Midwifery }	
Optional Classes	

Winter (2nd Term) —

Clinical Gynecology	10-11
Sec. C. Diseases of Children	11-1
Secs. A. and B. Clinical Medicine or Clinical Surgery	12
Dispensary Practice } if not previously attended	Afternoon
Practical Midwifery }	

Summer Term —

Clinical Work in Hospital.

(Examination in Midwifery, and in Clinical Medicine, and in Clinical Surgery, and corresponding Clinical Examinations.)

The candidate must attend Hospital for not less than three years: must attend both Clinical Medicine and Clinical Surgery for a period of at least nine months; twenty cases of Midwifery, or twelve cases and three months' attendance at a Maternity Hospital; and Post-Mortem Examinations for three months.

It is required that, before commencing the study of Practical Midwifery, every student shall have held the offices of Clinical Medical Clerk and Surgical Dresser, and have attended a Course of Lectures on Surgery and Midwifery.

Two of the five years of study must be spent at the University, and not less than eight of the compulsory subjects of study must be taken in the University.

The minimum expense of M.B. and Ch.B., including fees for Classes, Hospital, Matriculation and Examination, amounts to about £143.

DEGREE OF M.D.

Each candidate for this degree who began medical study after 1st October 1892 must be of the age of twenty-four years or upwards, and must have obtained the degrees of M.B. and Ch.B. of the University. He must either have been engaged for two years in general practice, or for one year in the naval or military medical services, or in the medical wards of a hospital, or in scientific research. He must present a thesis written by himself on a medical subject, and pass an examination in Clinical Medicine. In this examination the candidate has to write a report and commentary on at least three cases, and has to show a practical knowledge in the application of the ophthalmoscope, laryngoscope, electrical apparatus, and sphygmograph, in the examination of the blood, and in the chemical and microscopical examination of the excreta.

The candidate who has graduated M.B. and Ch.B. under the old regulations may either proceed to the degree of M.D. under the old regulations (under which he is not required to pass an examination in Clinical Medicine, but must have passed examinations in Greek and in Logic or Moral Philosophy), or he may proceed to the degree as if he had graduated M.B., Ch.B. under the New Regulations.

DEGREE OF CH.M.

Each candidate must be not less than twenty-four years of age, must possess the degrees of M.B., Ch.B., must have attended the surgical wards of a hospital for one year, or have spent one year in scientific research or in the naval or military medical services, or two years in practice other than that restricted to medicine. He must submit a thesis on a surgical subject, and pass an examination on Clinical Surgery and its branches, Surgical Anatomy, and Operations on the Dead Body.

FEES FOR M.D. AND CH.M.

The fee for the M.D. degree under the old regulations is five guineas; for the M.D. or Ch.M., under the New Regulations, ten guineas. The candidate must have paid the matriculation fee for the year in which he presents himself for examination or graduation. At each reappearance for examination, under the New Regulations, the fee is five guineas.

DEGREES IN PUBLIC HEALTH.

Two degrees are granted by the University of Edinburgh in the department of Sanitary Science, viz. B.Sc. and D.Sc.

BACHELOR OF SCIENCE.

Candidates must be graduates in Medicine of a University of the United Kingdom or of some other recognised University. In order to obtain the degree two examinations have to be passed.

First Examination.—Before entering for this examination the candidate must, after graduating in Medicine, have worked in a recognised Public Health Laboratory for eight months, of which five consecutive months must be passed in the Public Health Laboratory of the University of Edinburgh.

He must also have attended in a Scottish University a course of lectures on Physics and a course of lectures on Geology, extending over three months, and approved of by the University Court.

The subjects of examination are as follows:—

- (1) *Laboratory work*—Practical, written and oral; examination of water, air, foods, beverages, condiments, sewage; soils; disinfectants; building materials; clothing; bacteriology.
- (2) *Physics.* (3) *Geology.*

Second Examination.—This cannot be taken until eighteen months after graduating in medicine; nor sooner than six months after passing the First B.Sc. Examination. The candidate must have attended two separate courses on Public Health, either in the University of Edinburgh or in some other recognised University or School.

Each course must consist of forty lectures, and include Medicine in its relation to Public Health and Sanitary Engineering.

The candidate must likewise produce evidence that (1) for six months he has studied sanitary work under a Medical Officer of Health for a county or burgh of not less than 25,000 inhabitants; (2) that he has studied clinically for three months infectious diseases in a recognised institution; (3) that for three months he has been instructed by a recognised teacher in mensuration and drawing.

The subjects of examination are:—

- (1) Sanitation; (2) Sanitary Law; (3) Vital Statistics; (4) Medicine in Relation to Public Health.

The candidate is examined orally, practically, and by a written paper. *Sanitation* includes making reports on dwellings, workshops, hospitals and sanitary schemes.

The University Court may modify the work and instruction prescribed from time to time.

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DOCTOR OF SCIENCE.

A graduate after having held the degree of B.Sc. for five years may present himself for the D.Sc. He must present a thesis or a published work or memoirs, the result of his own research, and must pass an examination in Public Health, and in such of its special subjects as the Senate may determine. The candidate must submit the subject in which he proposes to be examined for approval not less than two months before the examination.

FEES PAYABLE.—First and second examinations, £3, 3s. each ; for D.Sc., £10, 10s.

INSTITUTIONS FOR CLINICAL INSTRUCTION IN EDINBURGH.

Royal Infirmary. 860 beds and 40 out-patients. Fees—perpetual ticket, £12 ; one year, £6, 6s. ; six months, £4, 4s. ; three months, £2, 2s. Clinical instruction is given daily in Medicine, Surgery, and all their special branches.

Royal Hospital for Sick Children. 120 beds. Hospital ticket, £1, 1s. Fee for Qualifying Course, £2, 2s.

City Hospital for Infectious Diseases. 600 beds. Fee, £1, 1s.

Royal Maternity and Simpson Memorial Hospital. 40 beds. The Maternity Residency affords accommodation for twelve students.

Royal Asylum, Morningside. 500 beds.

The fee for a qualifying course at each of these last two institutions is £2, 2s.

Royal Victoria Hospital for Consumption and Diseases of the Chest. 50 beds. Out-Patient Department at Spittal Street.

Eye, Ear and Throat Infirmary. 6 beds ; 2700 Out-Patients yearly. Fee for three months, £1, 1s.

Royal, New Town, Medical Missionary (Cowgate), Western, Provident (Marshall Street), Eye, and Skin Dispensaries.

PROFESSORS AND LECTURERS IN EDINBURGH.

The Courses given by the Extra-Mural Lecturers are recognised by the University and other examining boards as qualifying for graduation.

Botany— Professor Bayley Balfour, M.D., Botanical Gardens.
James A. Terras, B.Sc., New School.

Zoology— Professor J. Cossar Ewart, M.D., University.
Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Surgeons' Hall.
Hugh Miller, F.Z.S., 29 George Square.

Biology— Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Surgeons' Hall.
C. R. Whittaker, F.R.C.S., New School.

Physics— Professor C. G. Barkla, D.Sc., University.
C. G. Knott, D.Sc., University.
Dawson Turner, M.D., Surgeons' Hall.
A. McKendrick, F.R.C.S., New School.

Chemistry— Professor Walker, University.
G. H. Gemmell, F.I.C., 4 Lindsay Place.
T. W. Drinkwater, Ph.D., Surgeons' Hall.

Anatomy— Professor A. Robinson, M.D., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.

Applied Anatomy— H. J. Stiles, M.B., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.

Physiology— Professor Sir E. A. Schäfer, LL.D., University.
Alexander Goodall, M.D., Surgeons' Hall.

Materia Medica and Therapeutics—
Professor Sir Thomas R. Fraser, M.D., University.
William Craig, M.D., Surgeons' Hall.
John Orr, M.D., New School.

Pathology— Professor Lorrain Smith, M.D., University.
James Miller, M.D., Surgeons' Hall.

Surgery— Professor Alexis Thomson, University.
A. A. Scot Skirving, C.M.G., F.R.C.S., 27 Nicolson Square.
G. L. Chiene, F.R.C.S., New School.
Henry Wade, F.R.C.S., Surgeons' Hall.
J. W. Struthers, F.R.C.S., New School.
W. J. Stuart, F.R.C.S., 59 Forrest Road.
Lewis Beesly, F.R.C.S., Surgeons' Hall.

Clinical Surgery—
The Surgeons of the Royal Infirmary.
Professor F. M. Caird.
Professor Alexis Thomson.
C. W. Cathcart.
J. W. B. Hodsdon.
David Wallace.
Alexander Miles.
John W. Dowden.
And Assistant Surgeons.

Practice of Medicine—
Professor J. Wyllie, M.D., University.
Harry Rainy, M.D., 27 Nicolson Square.
R. A. Fleming, M.D., 27 Nicolson Square.
G. Lovell Gulland, M.D., Surgeons' Hall.
A. Dingwall Fordyce, M.D., Dental Hospital.
W. T. Ritchie, M.D., Surgeons' Hall.

Clinical Medicine—
The Physicians of the Royal Infirmary.
Professor Sir Thomas R. Fraser.
Professor John Wyllie.
Professor Wm. Russell.
Sir R. W. Philip.
Dr. Lovell Gulland.
Dr. Graham Brown.
Dr. F. D. Boyd.
Dr. R. A. Fleming.
And Assistant Physicians.

Midwifery and Gynaecology—
Professor Sir J. Halliday Croom, M.D., University.
D. Berry Hart, M.D., Surgeons' Hall.
J. W. Ballantyne, M.D., Surgeons' Hall.
A. H. F. Barbour, M.D., University and Royal Infirmary.
J. Haig Ferguson, M.D., New School.
N. T. Brewis, F.R.C.S., Royal Infirmary.
E. M. Inglis, M.B.
John Mc'Gibbon, M.B., 59 Forrest Road.
G. F. B. Simpson, M.D., New School.
H. S. Davidson, F.R.C.S., Nicolson Square.

Insanity— G. M. Robertson, M.D., University and Royal Asylum.
John Keay, M.D., Surgeons' Hall and Bangour Village Asylum.

Diseases of the Ear—

W. G. Sym, M.D., Royal Infirmary.
J. V. Paterson, M.B., Royal Infirmary.
A. H. H. Sinclair, M.D. (Ophthalmoscopy), 45 Leitham Place.

*Vaccination—*J. B. Buist, M.D., Western and Cowgate Dispensaries.

W. G. Aitchison Robertson, M.D., D.Sc., Royal Dispensary.

Diseases of Children—

John Thomson, M.D.
H. J. Stiles, M.B.
J. S. Fowler, M.D.
J. W. Simpson, M.D.

Diseases of the Skin—

Norman Walker, M.D., Royal Infirmary.
Frederick Gardiner, M.D., Surgeons' Hall.

Diseases of the Ear, Nose and Throat—

A. Logan Turner, M.D., Royal Infirmary.
J. Malcolm Farquharson, M.B., Royal Infirmary.
J. S. Fraser, M.B., Surgeons' Hall.

Forensic Medicine—

Professor Harvey Littlejohn, F.R.C.S., University.
W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.

Public Health—

Professor C. Hunter Stewart, M.B., University.
W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.
Wm. Robertson, M.D., Surgeons' Hall.

Fevers—

Alexander James, M.D., City Hospital.
C. B. Ker, M.D., City Hospital.

Bacteriology—

Professor James Ritchie, M.D., University.
J. Taylor Grant, M.D., 4 Lindsay Place.
James Miller, M.D., Surgeons' Hall.

Diseases of Tropical Climates—

Major D. G. Marshall, I.M.S., University and Surgeons' Hall.

Practical Medicine and Physical Diagnosis—

Alexander Goodall, M.D., Surgeons' Hall.
R. A. Fleming, M.D., Nicolson Square.
J. D. Comrie, M.D., 59 Forrest Road.

Neurology— J. J. Graham Brown, M.D., University.

Physical Methods in the Treatment of Diseases—

Harry Rainy, M.D., University.

Diseases of the Chest—

Sir R. W. Philip, M.D., Royal Victoria Hospital.

Medical Electricity and Röntgen Rays—

Dawson Turner, M.D., Surgeons' Hall.

Practical Anæsthetics—

D. C. A. McAllum, University.

History of Medicine—

J. D. Comrie, M.D., University.

MEDICAL EDUCATION OF WOMEN IN EDINBURGH.

SCHOOL OF MEDICINE FOR WOMEN, SURGEONS' HALL.

The courses of instruction given in this School qualify for graduation in Medicine. The curriculum and class fees are the same as for male students proceeding to the University Degree or College Qualification respectively. Clinical tuition is provided in the Royal Infirmary, Sick Children's Hospital, Bangour Asylum, and the City Hospital.

A sitting-room is provided for the students. A lady secretary is in daily attendance at the office. A new dissecting-room was opened last year, and the services of a whole-time lady demonstrator of anatomy are available. A prospectus may be had on application to Miss Keith, Secretary, Surgeons' Hall.

UNIVERSITY OF GLASGOW.

DEGREES OF M.B. AND CH.B.

Within recent years the facilities for both scientific and practical training have been much extended and improved. New and fully equipped laboratories have been added in connection with nearly all the scientific subjects, the most recent addition being a large building, completed at a cost of £40,000, for the departments of Physiology, Materia Medica, and Public Health. There is a large and well-equipped Pathological Institute at the Western Infirmary in which the University Classrooms are placed, and the Professor of Pathology is *ex officio* Pathologist to the Infirmary, and has control of all the pathological material for purposes of instruction and investigation. A corresponding arrangement forms part of the new scheme just being completed with regard to the Royal Infirmary. The Western Infirmary is close to the University, and has hitherto been the chief field of clinical instruction of University students. A scheme has, however, been carried through, according to which University Chairs, on the same footing as those already in existence, have been instituted at the Royal Infirmary in the subjects of Pathology, Medicine, Surgery, Midwifery, and Gynæcology. Students accordingly have the option of taking the subjects of the two final years of study at the Royal Infirmary, and in this way the advantage is afforded of a very wide clinical field along with systematic instruction under University Professors. The great disadvantage of attending classes at Gilmorehill and going to the Royal Infirmary, at a considerable distance, for clinical work is thus done away with.

The latest development is the institution, at the Western Infirmary, of a Laboratory for Clinical Pathology, the Director of which is also a University Lecturer, and gives instruction to University students in the scientific methods of clinical diagnosis.

Under the New Ordinance of the University Court, which came into operation on 1st October 1911, the regulations for these Degrees (except in regard to the Preliminary Examination) have been considerably altered, the chief modifications being as follows:— 1. A rearrangement of the subjects of the four Professional Examinations. 2. The rendering compulsory of some courses which hitherto have been optional. 3. The imposition of restrictions as to the period at which certain subjects of the curriculum can be taken.

The academical year is now divided into three terms of about ten teaching weeks each, and the following list gives the subjects of the several Professional Examinations, with the period of study required:—

FIRST EXAMINATION.

Chemistry (including Organic Chemistry), 2 terms : with Practical Chemistry, 1 term.

Physics (with practical work), 1 term.

Botany (with practical work), 1 term.

Zoology (with practical work), 1 term.

SECOND EXAMINATION.

Anatomy and Practical Anatomy, 5 terms.

Physiology and Practical Physiology, 3 terms.

THIRD EXAMINATION

Materia Medica and Therapeutics, 2 terms.

Pathology and Practical Pathology, 3 terms.

FOURTH EXAMINATION.

Medical Jurisprudence and Public Health, 2 terms.

Surgery, 2 terms.

Practice of Medicine, 2 terms.

Midwifery and Diseases Peculiar to Women and Infants, 2 terms.

The candidate must have attended the Medical and Surgical practice of a general hospital for three years, and courses of Clinical Surgery and Clinical Medicine of nine months in each case. He must also have received instruction, under conditions laid down, in the following subjects:—

Mental Diseases.

Practical Pharmacy.

Out-Patient Practice.

Clinical Clerking in Medicine.

Clinical Clerking or Dressing in Surgery.

Post-Mortem Examinations.

Infectious Diseases.

Gynæcology.

Diseases of Children.

Ophthalmology.

Diseases of the Ear and Throat.

Dermatology.

Practical Midwifery with the Conduct of Cases of Labour.

Vaccination.

Administration of Anæsthetics.

Operative Surgery.

The following courses cannot be taken till after the end of the terms of the curriculum indicated in each case:—

Physiology and Practical Physiology—third term, and not (except Practical Histology) till at least three of the subjects of the First Examination have been passed.

Materia Medica and Therapeutics, and Pathology and Practical Pathology—sixth term.

Medical Jurisprudence and Public Health—eighth term.

Midwifery, etc., Surgery and Medicine—ninth term, with the exception that Surgery may be attended after the sixth term, provided that the candidate has passed the Second Professional Examination.

Hospital Practice, Clinical Medicine, Clinical Surgery—sixth term.

The curriculum extends over five years, two of which must be spent in the University of Glasgow. The remaining three years may be spent elsewhere, as indicated in the Ordinance and under the conditions thereby imposed.

Except in the case of Medicine, Surgery, and Midwifery, the Senate may accept the Professional Examinations of other Scottish Universities.

There are a number of other administrative regulations which need not here be specified in detail.

The examination fees are £23, 2s. in all, with an additional fee of £1, 1s. for every re-entry. The cost of the curriculum amounts roughly to £145, spread over the five years of the course, and at present the class fees are charged at so much a class. There is, however, a movement on foot to introduce a “composition” or “inclusive” fee per session, but the total will work out at practically the above figure.

CLINICAL FACILITIES.

The following general hospitals, all of which are equipped in a modern fashion, are available for instruction of University students, viz. the Western Infirmary close to the University, the Royal Infirmary, to which the new Medical Chairs are attached, each of these having at present about 600 beds, and the Victoria Infirmary, with 260 beds, on the south side of the city.

The Eye Infirmarys at 174 Berkeley Street and 80 Charlotte Street (between them 100 beds), and the Ophthalmic Institution at 126 West Regent Street (35 beds), furnish ample opportunities for instruction in the important branch with which they deal ; Insanity is equally well provided for at Gartnavel (of which the Superintendent is University Lecturer on that subject—460 beds), at Gartloch (806 beds), and at Woodilee (1160 beds), while the City Fever Hospitals at Ruchill (540 beds) and Belvidere (680 beds) are available for the study of Zymotic Diseases. The Ear, the Throat and Nose, and the Skin are dealt with in the Western and Royal Infirmarys.

A new Maternity Hospital, with every modern convenience and equipment, was recently opened in Rottenrow, with accommodation for 104 patients, and a Hospital for Sick Children, of greatly increased dimensions, in freer air, has been erected at Yorkhill within a short distance of the University. The beds number 200.

The Ordinance is applicable alike to men and women students, and much of the instruction is given in "mixed" classes by the Professors. There are, however, exceptions to this, some classes for women alone being held in a separate building (Queen Margaret College), and some for both sexes (in the main buildings at Gilmorehill) at different hours. The Hospital work in the case of women has hitherto been taken entirely in the Royal Infirmary, there being no accommodation for them in the Western. This arrangement is likely to continue.

PROFESSORS.

<i>Zoology</i> —	Professor Graham Kerr, M.A., F.R.S.
<i>Chemistry</i> —	Professor Ferguson, M.A., LL.D., F.S.A.
<i>Practical Physics</i> —	
	Professor Gray, M.A., LL.D., F.R.S.
<i>Botany</i> —	Professor Bower, Sc.D., F.R.S.
<i>Anatomy</i> —	Professor Bryce, M.A., M.D.
<i>Physiology</i> —	Professor Noël Paton, B.Sc., M.D., F.R.S.
<i>Materia Medica and Therapeutics</i> —	
	Professor Stockman, M.D.
<i>Pathology</i> —	Professor Muir, M.A., M.D., F.R.S.
<i>Medical Jurisprudence and Public Health</i> —	
	Professor Glaister, M.D., D.P.H.(Camb.).
<i>Surgery and Clinical Surgery</i> —	
	Professor Sir William Macewen, M.D., LL.D., D.Sc., F.R.S.
<i>Midwifery</i> —	Professor Murdoch Cameron, M.D.
<i>Practice of Medicine and Clinical Medicine</i> —	
	Professor T. Kirkpatrick Monro, M.A., M.D.
<i>Public Health</i> —	
	Professor Glaister, M.D., D.P.H.(Camb.).
<i>Pathology</i> —	Professor John H. Teacher, M.A., M.D.
<i>Medicine and Clinical Medicine</i> —	
	Professor Walter K. Hunter, D.Sc., M.D.
<i>Surgery and Clinical Surgery</i> —	
	Professor Robert Kennedy, M.A., D.Sc., M.D.

Midwifery—

Professor John M. Munro Kerr, M.D.

LECTURERS.

Organic Chemistry—

T. S. Patterson, Ph.D., D.Sc.

Physiological Chemistry—

E. P. Cathcart, M.D., D.Sc.

Psychological Physiology—

Henry J. Watt, M.A., Ph.D., D.Phil.

Ear—

Thomas Barr, M.D., and J. Kerr Love, M.D.

Throat and Nose—

James Walker Downie, M.B., and J. Macintyre, M.B.

Skin—

John Wyllie Nicol, M.B., and A. Morton, M.D.

Clinical Pathology—

John Shaw Dunn, M.A., M.D.

Bacteriology—

W. B. M. Martin, M.D.

Pathological Histology—

G. Haswell Wilson, M.B., Ch.B.

Physics—

James G. Gray, D.Sc.

Embryology—

James F. Gemmill, M.A., D.Sc., M.D.

Insanity—

Lancel R. Oswald, M.B., and J. H. Macdonald, M.B.

DEAN.

Professor Noël Paton, B.Sc., M.D., F.R.S.

DEGREE OF M.D.

This degree is open to holders of the M.B., Ch.B. diploma, after a period of one or two years, according to circumstances, has elapsed since the date of the latter. The requirements are (a) an Examination in Clinical Medicine, or in some approved department of Medical Science or Practice; (b) a Thesis on any branch of knowledge comprised in the examinations for M.B., Ch.B., excepting a subject which is exclusively surgical; and (c) a fee of £15, 15s., with an extra charge of £5, 5s. for each re-entry.

DEGREE OF CH.M.

This may be obtained on practically the same terms as the M.D. degree, the only differences being (1) that the examination is on Surgical Anatomy, operations upon the dead body, on Clinical Surgery or an approved special department of Surgery, and (2) that the Thesis must not be on a subject which is exclusively medical.

DEGREE OF B.Sc. IN PUBLIC HEALTH.

Candidates must be graduates in Medicine of a University in the United Kingdom or of some other University recognised for the purpose by the Glasgow University Court, and they must thereafter have received practical instruction, including instruction in Chemistry, Bacteriology, and the Pathology of the Diseases of Animals transmissible to man, for at least twenty hours per week during a minimum period of eight months, five consecutive months of which must be in the Public Health Laboratory of the University of Glasgow. Either before or after graduation in Medicine they must also have attended, in the University of Glasgow or elsewhere, courses of Physics and

Geology, and after graduation two separate courses in Public Health (Medicine and Engineering), as well as practically studying sanitary work for six months under a Medical Officer of Health in the United Kingdom, or a Sanitary Staff Officer of Health of the Royal Army Medical Corps, besides attending three months' practice of a Hospital for Infectious Diseases, where methods of administration can be studied, and three months in Mensuration and Drawing. The examinations are, *First*, Public Health, Laboratory Work, Physics, and Geology; *Second*, Sanitation, Sanitary Law, Vital Statistics, and Medicine in its bearings on Public Health. The examination fee is £6, 6s.

DEGREE OF D.Sc. IN PUBLIC HEALTH.

Five years after obtaining the B.Sc. degree, graduates may proceed to the higher Degree of D.Sc., the requirements being (*a*) a Thesis or a published memoir or work to be approved by the Senate; and (*b*) an examination in Public Health and in such of its special departments as the Senate and University Court may determine. The fee for this degree is £10, 10s.

QUEEN MARGARET COLLEGE FOR WOMEN.

A full course of Medicine and Surgery is obtainable partly at Queen Margaret College, but in recent years the tendency has been to have mixed classes at Gilmorehill. The regulations, fees, etc., are similar to those for men. The buildings are pleasantly situated in grounds of their own, close to the Botanic Gardens. The anatomical department is excellently arranged and most complete. Clinical work is amply provided for in the Royal Infirmary and its Dispensaries, and in the Royal Hospital for Sick Children, the Glasgow Maternity Hospital, the Royal Asylum of Gartnavel, and the Belvidere Fever Hospital. There are also arrangements for special study and research.

Students can have board and lodging at Queen Margaret Hall, within easy reach of the College, at the rate of about one guinea per week.

All information necessary can be obtained from Miss Melville, Queen Margaret College, Glasgow.

ST. MUNGO'S COLLEGE.

This, the Medical School of the Royal Infirmary, the largest hospital in Glasgow, is situated in Cathedral Square, Castle Street, and has car communication with every part of the city. St. Mungo's College is in the Infirmary grounds.

The Infirmary has, including the Ophthalmic Department, over 620 beds, the average number occupied in 1912 being 620. When the reconstruction of the Infirmary, long in progress, is completed, it will have about 700 beds. There are special beds and wards for Diseases of Women, of the Throat, Nose and Ear, Venereal Diseases, Burns, and Septic Cases.

At the Outdoor Department the attendances in 1905 numbered over 62,000. In addition to the large Medical and Surgical Departments, there are Departments for Special Diseases—namely, Diseases of Women, of the Throat and Nose, of the Ear, of the Eye, of the Skin, and of the Teeth. A fully-equipped Electrical Pavilion was opened a few years ago, and year by year the latest and most approved apparatus for diagnosis and treatment has been added. Wards are set apart for the teaching of women students.

Appointments.—Five House-Physicians and nine House-Surgeons, having a legal qualification in Medicine and Surgery, who board in the Hospital free of charge, are appointed every six months. Clerks and Dressers are appointed by the Physicians and Surgeons. As a large number of cases of Acute Diseases and Accidents of a varied character are received, these appointments are very valuable and desirable.

Fees.—The fees for hospital attendance, including Clinical Lectures and

Tutorial Instruction, attendance at the Out-patient Department, at the Pathological Department, Post-Mortem Examinations, and the use of the Museum, which has not long since been rearranged and catalogued, are as follows:—For one year, £10, 10s.; for six months, £6, 6s.; for three months, £4, 4s. Students who have paid fees to the amount of £21 to the Glasgow Royal Infirmary are permitted to attend, in any subsequent year or years, one Winter and one Summer Course of Instruction in the Infirmary without further payment; and students who have paid to any other hospital in the United Kingdom fees, being not less than £21, in virtue of which they are entitled to attend without further payment, shall be admitted as students of the Royal Infirmary on payment of £3, 3s. for six months, or £1, 11s. 6d. for three months.

THE ANDERSON COLLEGE OF MEDICINE,

DUMBARTON ROAD, PARTICK, GLASGOW.

The old Institution known as "Anderson's University" was founded by the will of John Anderson, M.A., F.R.S., in 1795, and the medical school connected therewith dates back to the year 1799.

In 1877 the name of the Institution was altered from "Anderson's University" to "Anderson's College." In 1887 the medical school of Anderson's College became a distinct Institution known as "Anderson's College Medical School."

The new buildings are situated in Dumbarton Road, immediately to the west of the entrance to the Western Infirmary and four minutes' walk from the University. They are constructed on the best modern principles, and are provided with all the appliances requisite for the conduct and management of a fully-equipped medical school.

Classes are conducted in all the subjects of the five years' curriculum:—

Anatomy—Professor A. M. Buchanan, M.A., M.D.

Physics—Professor Peter Bennett.

Chemistry—Professor J. Robertson Watson, M.A.

Botany—Professor B. G. Cormack, M.A., B.Sc.

Zoology—Professor W. Ferguson Mackenzie, M.B.

Physiology—Professor Hugh Morton, M.D.

Materia Medica—Professor J. P. Duncan, M.B., B.Sc.

Medical Jurisprudence—Professor Carstairs Douglas, D.Sc., M.D., F.R.S.E.

Midwifery—Professor W. D. Macfarlane, M.B., C.M.

Surgery—Professor Archibald Young, B.Sc., M.B.

Practice of Medicine—Professor John Cowan, B.A., D.Sc., M.D.

Ophthalmic Medicine and Surgery—A. Freeland Fergus, M.D., F.R.S.E.

Aural Surgery—James Galbraith Connal, M.B.

Diseases of Throat and Nose—John Macintyre, M.B., F.R.S.E.

Mental Diseases—Ivy Mackenzie, M.A., B.Sc., M.D.

Public Health Laboratory—Professor Carstairs Douglas, D.Sc., M.D., F.R.S.E.

Pathology—At the Western or Royal Infirmary.

Diseases of the Skin—J. Goodwin Tomkinson, M.D.

Dental Anatomy and Physiology—Professor Ferguson Macintosh, M.A., L.D.S.

Dental Surgery and Pathology—John Watt, L.R.C.P., L.D.S.

Dental Metallurgy—Chas. Read, L.D.S.

Dental Bacteriology—Professor S. C. Douglas, M.D., D.Sc., F.R.S.E.

Degrees and Diplomas.—Certificates of attendance on the classes at Anderson's College Medical School are received by the Universities of London and Dublin, by the Royal University of Ireland, and by all the Royal Colleges and Licensing Boards in the United Kingdom. They are also recognised by the Universities of Glasgow and Edinburgh under certain conditions which are stated in the Calendar of this school. The Public Health Laboratory course is recognised as qualifying for the Diploma granted by the Universities of Oxford, London, and Cambridge, the Scottish Conjoint Board, and the Royal Irish Colleges.

Candidates for the Licence in Dental Surgery can obtain at this School the full medical and dental curriculum which is required. The clinical work special to dentistry is conducted at the Glasgow Dental School, 15 Dalhousie Street.

Maleolm Kerr Bursary in Anatomy. Value about £10. Open to students of the junior anatomy class during session 1907-1908.

The Carnegie Trust will pay the fees of students at Anderson's, on conditions regarding which particulars may be obtained from Sir W. S. McCormick, LL.D., Carnegie Trust Offices, Edinburgh.

Class Fees.—For each course of lectures (anatomy, ophthalmic medicine and surgery, aural surgery, diseases of throat and nose, mental diseases, and dental classes excepted): first session, £2, 2s.; second session (in Anderson's College), £1, 1s.; afterwards free. For practical classes (except anatomy), viz. chemistry, botany, zoology, physiology, pharmacy, operative surgery: first session, £2, 2s.; second session, £2, 2s.

Reduced joint fees in zoology and in botany, for lectures and practical class when taken in same summer session, £3, 3s.; for either course separately, £2, 2s.

Anatomy.—Winter—first session, lectures and practical anatomy, £5, 5s.; practical anatomy alone, £2, 2s.; second session, lectures and practical anatomy, £4, 4s.; practical anatomy, £2, 2s.; for summer fees, see Calendar.

Dental Classes.—£3, 3s. each.

ABERDEEN UNIVERSITY.

The course of study for the degree of M.B., Ch.B. extends over five years, of which two at least must be spent in the University of Aberdeen.

The curriculum is the same as in the other Scottish Universities as far as relates to attendance on University classes, to clinical study at a General Hospital, to attendance on courses of Clinical Surgery, Clinical Medicine, Mental Diseases, and Practical Pharmacy, Operative Surgery, Anæsthetics, to instruction in Vaccination, to attendance on Cases of Labour, and to the practice of a Dispensary.

The candidate must also, before admission to the final examination, produce the following certificates:—

1. That he has been present at not fewer than twenty-five post-mortem examinations, some of which he must have personally taken part in performing.

2. That he has attended a course of instruction in Infectious Diseases consisting of not fewer than ten meetings, in a Hospital for the treatment of such diseases containing at least a hundred beds.

3. That he has attended in a Hospital a course of instruction in Gynecology consisting of not fewer than twenty meetings.

4. That he has attended in a special hospital a course of instruction in the Diseases of Children, consisting of not fewer than twenty meetings.

5. That he has attended in the Ophthalmological Department of a Hospital or Dispensary a course of instruction in Ophthalmology, consisting of not fewer than thirty meetings extending over one term.

6. That he has attended in a Public Hospital or Dispensary a course of instruction in Diseases of the Ear, Nose, and Throat, consisting of not fewer than twenty meetings.

7. That he has attended in a Public Hospital or Dispensary a course of instruction in Dermatology, consisting of not fewer than twenty meetings.

Certificates for these various classes and courses must attest not only regular attendance, but also due performance of the work.

There is no prescribed order of study, but a scheme, representing the minimum curriculum, has been drawn up for the guidance of students, and is printed in the Calendar.

THE FOLLOWING ARE THE CLASSES IN THE MEDICAL FACULTY:

WINTER SESSION.

Zoology—Professor John Arthur Thomson, M.A., LL.D.
Chemistry—Professor Frederick Soddy, M.A., F.R.S.
Anatomy—Professor Reid, M.D., F.R.C.S.
Practical Anatomy—Professor Reid and Assistants.
Physiology (Syst. and Pract.)—Professor MacWilliam, M.D.
Materia Medica—Professor Cash, M.D., LL.D., F.R.S.
Pathology (Syst. and Pract.)—Professor Theodore Shennan, M.D., F.R.C.S.E.
Public Health—Mr. John Parlange Kinloch, M.D., LL.D.
Surgery—Professor John Marnoch, M.A., M.B., C.M.
Medicine—Professor Mackintosh, M.A., M.D.
Midwifery and Diseases of Women and Children—Professor R. G. McKerron, M.A., M.D.

SUMMER SESSION.

Botany—Professor Trail, M.A., M.D., F.R.S.
Practical Botany—Professor Trail.
Zoology—Professor Thomson.
Practical Zoology—Professor Thomson.
Physics—Professor Niven, M.A., D.Sc., F.R.S.
Practical Chemistry—Professor Soddy and Assistants.
Practical Anatomy—Professor Reid and Assistants.
Practical Materia Medica and Pharmacy—Professor Cash and Assistants.
Physiology (Syst. and Pract.)—Professor MacWilliam.
Forensic Medicine—Professor Hay, M.D., LL.D.
Practical Hygiene and Forensic Medicine—Professor Hay.
Pathology (Syst. and Pract.)—Professor Shennan.
Practical Midwifery and Gynaecology and Clinical Diseases of Children—Professor McKerron.

Systematic and Practical Pathology, and Systematic and Practical Physiology respectively, are taught as part of one continuous course, comprising a whole academic year, *i.e.* a summer and a winter session.

There are Assistants to the Professors in the Medical Faculty appointed annually, three in the Department of Chemistry, two in the Departments of Anatomy, Physiology, Botany, Zoology, Pathology, and Materia Medica, and one in each of the other departments.

Clinical Medicine and Clinical Surgery are taught by the Physicians and Surgeons of the Royal Infirmary.

The following are recognised as Lecturers:—

Lecturer on Mental Diseases . . .	Wm. Reid, M.D.
„ Ophthalmology . . .	{ C. H. Usher, M.B., B.S., F.R.C.S.
„ Vaccination . . .	{ A. Randolph Galloway, M.A., M.B., C.M.
„ Skin Diseases . . .	{ T. Fraser, M.A., M.B., Ch.B.
„ Diseases of Ear, Throat, and Nose . . .	{ J. F. Christie, M.A., M.B., C.M.
„ Medical Electricity . . .	{ J. Mackenzie Booth, M.D., C.M.
„ „ „ „ „ „	{ H. Peterkin, M.B.
„ „ „ „ „ „	{ J. R. Levaack, M.B., C.M.
„ „ „ „ „ „	{ Alex. Ogston, M.B., C.M.
„ „ „ „ „ „	{ D. W. Geddie, M.B., C.M.

All the University Classes are held at Marischal College.

Tutorial Classes are held in connection with most of the Systematic Courses, and practical instruction is given in the fully-equipped Laboratories connected with the several departments.

Graduates or others desirous of engaging in special study or research may be allowed by the Senatus to work in any of the Laboratories on payment of the usual matriculation fee.

General clinical instruction is obtained in the following Medical Institutions :—

The Royal Infirmary of Aberdeen.

This General Hospital, situated about seven minutes' walk from Marischal College, has been recently constructed on the most modern principles, and is fully equipped with all the requirements for medical work and teaching. It accommodates upwards of 260 patients : the number of patients admitted during the year 1913 was 3140, and the number of out-patients treated during the same period was 17,054.

Six resident medical officers are appointed annually, three in May and three in September, to hold office for twelve months. Salary, £26, 5s. with board.

Fees.—Perpetual fee to hospital practice, £10, or first year, £5, 10s., second year, £5, afterwards free ; clerkship in medicine, £1, 1s. ; dressership in surgery, £1, 1s. ; pathological demonstrations, £2, 2s. (Special courses of lectures are charged for.)

The Royal Hospital for Sick Children.

Is situated about five minutes' walk from Marischal College, and accommodates over 80 patients. The number of patients admitted in 1913 was 1033, and the number of out-patients treated was 2204. Each student must act as clerk for six weeks in the medical and surgical wards respectively.

There are two resident medical officers, senior and junior, who hold office for six months. Salary at the rate of £25 per annum in the case of the senior resident, and £20 per annum in the case of the junior resident.

Fee for hospital practice, £2, 2s. first year ; subsequent years, £1, 1s.

The Royal Asylum.

Is about fifteen minutes' walk from Marischal College. It accommodates over 950 patients, and has been recently fitted up with a fully-equipped hospital and a laboratory.

The senior physician is recognised by the University as lecturer on mental diseases, and delivers a qualifying course of lectures.

The City (Fever) Hospital.

Is about ten minutes' walk from Marischal College, and accommodates 250 patients.

Senior students are admitted for instruction in fevers twice a week under the visiting physician (who is the Medical Officer of Health for the City) and his assistant. Fee, £1, 1s.

General Dispensary, Maternity Hospital, and Vaccine Institution.

This is about five minutes' walk from Marischal College.

The total number of cases treated during 1913 was 7387, and the number of patients treated at their own homes 2076. There were 296 midwifery cases.

Fees.—General practice, £3, 3s. ; vaccination certificate and instruction, £1, 1s. ; Maternity Hospital, £3, 3s.

Ophthalmic Institution.

This Institution is situated about three minutes' walk from Marischal College. The surgeon in charge is recognised by the University as a lecturer on ophthalmology.

During 1913, 53 in-patients and 3311 out-patients were treated.

PROFESSIONAL EXAMINATIONS.

There are four examinations: the subjects and regulations of these are common to the Universities of Aberdeen and Glasgow.

DEGREE OF M.D.

The regulations with regard to the age and other qualifications of the candidate are similar to those in the other Scottish Universities. He must submit a thesis written by himself upon any medical subject, and pass an examination in Clinical Medicine or in some Special Department of Medical Science or Practice.

DEGREE OF CH.M.

Each candidate must be not less than twenty-four years of age, and must hold the degree of M.B., Ch.B. of the University. He must produce a certificate of having been engaged for at least one year in attendance in the surgical wards of a hospital, or in scientific research, or in the naval and military services, or for two years in practice other than practice restricted to medicine. He must present a thesis on a surgical subject and pass an examination in Clinical Surgery, Surgical Anatomy, and Operations on the Dead Body.

DIPLOMA IN PUBLIC HEALTH (D.P.H.).

The diploma is conferred, after special instruction and examination, on any one who has been at least twelve months a graduate in medicine of a University in the United Kingdom; if not a graduate of Aberdeen University, the candidate must attend a course of instruction in this University in one or more subjects embraced in the examination for the diploma.

Each candidate must have attended a course of instruction in Public Health.

The qualifying post-graduate instruction embraces—

- (a) Regular attendance, for three months, at a hospital for infectious diseases, at which opportunities are afforded for the study of methods of administration.
- (b) Daily association for a period of six months (of which at least three months must be distinct from the period of laboratory instruction) in the duty, routine and special, of Public Health Administration, under the supervision of a recognised Medical Officer of Health.
- (c) Practical instruction, for at least six months, in laboratory work, which includes examination of water, air, soil and foods, and the study of bacteriology, disinfection, ventilation, water supply and sewerage, and the framing of reports of analysis. The laboratory attendance must extend over at least fifteen hours a week.

The qualifying courses of laboratory instruction in Aberdeen University are given in the Public Health Laboratory (fee, £6, 6s.) and the Physiological Laboratory (fee, £4, 4s.).

Instruction in Public Health Administration is given by Professor Hay, Medical Officer of Health of the City of Aberdeen (fee, £6).

Instruction is given in the Drawing and Interpretation of Plans (fee, £1, 1s.).

A short course of lectures is given on Statistical Methods and their application to Public Health.

The diploma is conferred after an examination in March and July of each year.

The examination is written, oral and practical, and is divided into two parts.

Part I. embraces the following subjects in their application to Public Health:—

- (a) Physics, Engineering, and Meteorology.
- (b) Chemistry, Microscopy, and Bacteriology.

Part II. embraces—

- (a) General Hygiene.
- (b) Sanitary Law and Vital Statistics.

Part I. may be taken alone, or both parts together.

The written examinations occupy two days, and the oral and laboratory and outdoor examinations three to four days.

Candidates must send in their names and pay the fees a fortnight before the examination. Examination fee is five guineas. Re-examination fee one guinea.

FEES.

Arrangements have been made, in conjunction with the other Scottish Universities, for the institution of an inclusive fee for the courses of instruction leading to the M.B. and Ch.B. degrees. The inclusive fee for instruction within the walls of the University is ninety guineas, payable in five annual instalments.

The cost of matriculation, class and hospital fees for the whole curriculum, including the fees for the degrees, is usually about £160.

UNIVERSITY OF ST. ANDREWS.

The degrees conferred are Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.). The inclusive fee for the University instruction for M.B., Ch.B. is ninety guineas; and the inclusive fee for the clinical courses is forty guineas. These fees may be paid by annual instalments. For M.D. or Ch.M. the fee payable is fifteen guineas.

Two constituent colleges of the University provide medical teaching. The United College, St. Andrews, offers classes for two years, and the student may pass the first and second professional examinations at St. Andrews. There are excellent opportunities for combining degrees in Arts and Science with those of Medicine. Inclusive fees have been arranged for students who wish to take advantage of these opportunities. There are many bursaries offered to students who desire to graduate in Medicine, and it should be added that the cost of rooms and of living in St. Andrews is considerably less than in the larger University cities. For women there is an excellent residential hall, which is governed by the University authorities. The medical school is now carried on in buildings specially built for the purpose.

The Conjoint School of Medicine, Dundee, supplies a complete course of medical study, and the student from United College, St. Andrews, completes his curriculum there. Large new buildings with well-equipped laboratories have been provided. Both in the Medical School and the wards of the Dundee Royal Infirmary the students have unrivalled opportunities for gaining a practical knowledge of medical science and of medical work, for the students have individual attention and supervision which the larger schools cannot give.

The Dundee Royal Infirmary contains 400 beds, and includes special wards for obstetrics, gynaecology, children's diseases, ophthalmology, dermatology, otology, incipient insanity, and electrical therapeutics. New out-patient departments are now in use. There is a large out-door maternity department. Hospital Fees—Surgical and Medical £3, 3s. yearly; Perpetual Ticket, £10, or in instalments, £10, 10s.; Obstetric Cases, £2, 2s.; Obstetric Clinic, £1, 1s.

Westgreen Asylum at Liff provides abundant material for instruction in

mental diseases, and the City Fever Hospital in fevers. The Dundee Eye Institution furnishes cases for instruction in ophthalmology.

The Diploma of Public Health (D.P.H.) may be taken at the Joint School of Medicine, Dundee.

All classes in the University are open to men and women alike.

UNITED COLLEGE, ST. ANDREWS.

PROFESSORS AND LECTURERS.

- Physics*— Professor Butler, M.A.
Chemistry— Professor Irvine, Ph.D., D.Sc.
Zoology— Professor M'Intosh, M.D., LL.D., F.R.S.
Botany— R. A. Robertson, M.A., B.Sc.
Physiology— Professor Herring, M.D.
Anatomy— Professor D. Waterston, M.D., F.R.C.S.
Regional Anatomy—
 D. R. Dow, M.B.

UNIVERSITY COLLEGE, DUNDEE.

PROFESSORS AND LECTURERS.

- Physics*— Professor Peddie, D.Sc.
Chemistry— Professor Mackenzie, D.Sc.
Zoology— Professor Thompson, M.A., D.Litt., C.B.
Botany— Professor Geddes, F.R.S.E.
Physiology— Professor Waymouth Reid, M.B., Sc.D., F.R.S.
Anatomy— Principal Mackay, M.D., LL.D.
 Lieut.-Col. Lamont, M.B., I.M.S. (retired).
Surgery— Professor MacEwan, M.D., C.M.
Surgery, Clinical—
 D. M. Greig, C.M., F.R.C.S.
 L. Turton Price, Ch.B., F.R.C.S.
Medicine— Professor Stalker, M.D.
Medicine, Clinical—
 Professor Stalker, M.D. ; J. Mackie Whyte, M.D.
Materia Medica—
 Professor C. R. Marshall, M.D.
Pathology— Professor Sutherland, M.B.
Midwifery and Gynecology—
 Professor Kynoch, M.B., F.R.C.P., F.R.C.S.
Midwifery and Gynecology, Clinical—
 Professor Kynoch, M.B.
 R. C. Buist, M.D.
Forensic Medicine—
 C. Templeman, M.D., D.Sc., M.O.H.
Ophthalmology—
 Angus MacGillivray, M.D., D.Sc.
Diseases of Ear, Nose, and Throat—
 R. P. Mathers, M.D.
Diseases of Children—
 D. M. Greig, C.M., F.R.C.S.
 J. S. Y. Rogers, M.B.

Diseases of Skin—

W. E. Foggie, M.D.

Mental Diseases—

W. Tuach Mackenzie, M.D.

Vaccination—

R. C. Buist, M.D.

Clinical Pathology—

F. M. Milne, M.B., D.P.H.

Clinical Medical Tutor—

Charles Kerr, M.B.

Clinical Surgical Tutor—

W. L. Robertson, Ch.B., F.R.C.S.

Anæsthetics—

A. Mills, M.D.

Dean of the Faculty of Medicine—

Professor Kynoch.

QUALIFICATIONS GIVEN BY THE SCOTTISH COLLEGES.

The Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, conjointly confer the Triple Qualification (L.R.C.P.E., L.R.C.S.E., L.R.F.P.S.G.). Female candidates are admitted to the examinations for this qualification.

PRELIMINARY EXAMINATION.—This examination must be passed before the student commences professional study. It may be passed before any of the Boards recognised by the General Medical Council, and enumerated in the Regulations of the Colleges. The Educational Institute of Scotland conducts a qualifying Preliminary examination for medical students, in Edinburgh and Glasgow, on behalf of the Colleges. This examination embraces English, Latin, Mathematics, and either Greek, French, German, Italian, or other modern language. All the subjects may be passed at one or not more than two times. Calendar, containing examination papers, can be had from Mr. Hugh Cameron, M.A., 34 North Bridge Street, Edinburgh. Price 1s.

PROFESSIONAL EDUCATION.—The curriculum must extend over five years. Graduates in Arts or Science of any recognised University who have spent a year in the study of Physics, Chemistry, and Biology, and have passed an examination in these subjects for the degrees in question, are exempted from the first year of study. The fifth year of study should be devoted to clinical work in one or more recognised Hospitals or Dispensaries, and to the study of special diseases. For information regarding the payment of class fees by the Carnegie Trust, *vide* p. i.

ORDER OF STUDY WHICH IS RECOMMENDED.

First Summer— Physics and Elementary Biology.

First Winter— Five months' course in Chemistry and Anatomy; three months' course in Practical Chemistry; Practical Anatomy.

Second Summer— Practical Anatomy and Lectures; Practical Physiology.

Second Winter— Practical Anatomy; Physiology—Five months' course.

Third Summer— Three months' course in Practical Pathology, Materia Medica, and Practical Materia Medica; Surgical Hospital Practice.

Third Winter— Six months' course in Surgery and Clinical Surgery; Attendance at Surgical Wards; Anæsthetics; Pathology.

Fourth Summer—Three months' course in Midwifery, in Gynaecology, in Medical Jurisprudence and Public Health, and in Clinical Surgery; Hospital Practice.

Fourth Winter—Six months' course in Medicine and Clinical Medicine; Hospital Practice.

Fifth Summer—Three months at Clinical Medicine; Hospital; Locality; Diseases of Children; Diseases of Eye.

Practical Midwifery—Personal attendance on twelve cases under the supervision of a medical practitioner, or three months' attendance at a Lying-in Hospital and personal attendance on six cases.

Fifth Winter—Hospital Practice; Fevers; Dispensary; Vaccination; Skin Diseases; Ear and Throat Diseases; Eye Diseases; Venereal Diseases; Operative Surgery.

PROFESSIONAL EXAMINATIONS.—Four of these are held during the curriculum. Each is held quarterly in Edinburgh and twice a year in Glasgow. Candidates may enter for all or any of the subjects at the First, Second, and Third Examinations. In the Final Examination the subjects of Medicine, Surgery and Midwifery shall be taken together at the conclusion of five Winters and five Summers of Medical Study, provided that a period of twenty-four months has elapsed since passing the Second Professional Examination; and the subject of Medical Jurisprudence and Public Health may be taken at any time after passing the Third Examination. Candidates are advised to enter for the entire examinations.

First Examination—Physics, Chemistry and Elementary Biology. This should be passed before the beginning of the second winter session.

Second Examination—Anatomy, Physiology, including Histology. This should be passed at the end of the second year of study.

Third Examination—Pathology, Materia Medica and Pharmacy. This should be taken at the end of the third year.

Final Examination—Can only be taken at the end of the fifth year. The candidate must have attained the age of twenty-one. It includes—

1. Medicine, Therapeutics, Medical Anatomy, Clinical Medicine.
2. Surgery, Surgical Anatomy, Clinical Surgery, Diseases and Injuries of the Eye.
3. Midwifery and Diseases of Women.
4. Medical Jurisprudence and Public Health. This can be taken any time after the Third Examination.

FEES FOR PROFESSIONAL EXAMINATIONS.

For each of the first three, £5; for the final, £15. The minimum total expense, inclusive of fees for classes and examinations, amounts to £115.

Fees for examinations in *Edinburgh* should be paid to Mr. D. J. Todd, 50 George Square, and in *Glasgow* with Mr. Walter Hors, 242 St. Vincent Street.

DIPLOMA IN PUBLIC HEALTH OF THE ROYAL COLLEGES.

The Diploma is granted by the Triple Qualification Board.

1. Every candidate for examination must hold a registrable medical qualification, which has been registered under the Medical Acts.

2. After obtaining such qualification he must have attended a recognised Laboratory in which Chemistry, Bacteriology, and the Pathology of the Diseases of Animals Transmissible to Man are taught; and the certificate must show that the candidate has conducted Chemical and Bacteriological analyses of air, water, sewage and foods, and certify that the candidate has attended not less than four calendar months, and that he has worked in the Laboratory for at least 240 hours, of which not more than one-half shall be devoted to Practical Chemistry.

3. After obtaining a registrable qualification he must during six months (of which at least three months shall be distinct and separate from period of Laboratory instruction required) have been engaged in acquiring a practical knowledge of the duties of Public Health Administration for not less than sixty working days under the personal supervision of—

- (a) In England or Wales, the Medical Officer of Health of a County or single sanitary District having a population of not less than 50,000, or a Medical Officer of Health devoting his whole time to Public Health work; or
- (b) In Scotland or Ireland, the Medical Officer of Health of a County or District or Districts with a population of not less than 30,000; or
- (c) In Ireland, a Medical Superintendent Officer of Health of a District or Districts having a population of not less than 30,000; or
- (d) In the British Dominions outside the United Kingdom, a Medical Officer of Health of a Sanitary District having a population of not less than 30,000, who himself holds a Registrable Diploma in Public Health; or
- (e) A Medical Officer of Health who is also a Teacher in the Department of Public Health in a recognised Medical School.
- (f) A Sanitary Staff Officer of the Royal Army Medical Corps having charge of an Army Corps, District, Command, or Division recognised for the purpose by the General Medical Council.

4. After obtaining a medical qualification he must have attended for three months at least twice weekly the practice of a Hospital for Infectious Diseases, at which he has received instruction in the methods of administration.

The examination consists of two parts. The first part includes—(a) Laboratory work, with Chemistry and Bacteriology; (b) Physics and Meteorology.

The Second Examination embraces—(a) Report on premises visited; (b) Examination at Fever Hospital; (c) Examination at Public Abattoir; (d) Epidemiology and Endemiology; (e) Vital Statistics and Sanitary Law; (f) Practical Sanitation.

Each examination is held bi-annually, in October and May. The fee for each is £6, 6s.; for re-examination, £3, 3s. Fees and applications to be lodged with Mr. D. L. Eadie, 50 George Square, Edinburgh; or with Mr. Walter Hurst, 242 St. Vincent Street, Glasgow.

MEMBERSHIP AND FELLOWSHIP OF THE ROYAL COLLEGE OF PHYSICIANS, EDINBURGH.

Every applicant for the *Membership* must possess a recognised qualification, and be not less than twenty-four years of age. He must pass an examination on Medicine and Therapeutics, on Clinical Medicine, and on some Special Department of Medicine, such as Psychological Medicine, General Pathology and Morbid Anatomy, Medical Jurisprudence, Public Health, Midwifery, Diseases of Women, Diseases of Children, Tropical Medicine, etc. The Membership is conferred by election.

The fee for the Membership is thirty-five guineas, except the applicant be a Licentiate of the College, when it is twenty guineas.

Members of not less than three years' standing may be raised by election to the *Fellowship*, the fee being thirty-eight guineas, exclusive of Stamp Duty of £25.

FELLOWSHIP OF THE ROYAL COLLEGE OF SURGEONS, EDINBURGH.

Every candidate must be twenty-five years of age, and must have been engaged for two years in the practice of his profession, after having obtained a recognised qualification in Surgery. The petition for examination must be signed by two Fellows—a proposer and seconder.

The candidate must pass an examination on Principles and Practice of Surgery, including Surgical Anatomy, Clinical Surgery, and any one of the optional subjects; Ophthalmic Surgery, Aural, Nasal and Laryngeal Surgery, Dental Surgery, Surgical Pathology and Operative Surgery, Gynaecology, Advanced Midwifery with Obstetric Surgery, Advanced Anatomy.

The fee is £15, except the candidate be a Licentiate of the College, when the fee is £35. Further particulars may be obtained from the Clerk to the College, 50 George Square, Edinburgh.

FELLOWSHIP OF THE ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

Every candidate must have been qualified for two years, and be aged twenty-four. Admission to the Fellowship is by examination and subsequent election. The candidate is examined on either (a) Medicine (including Clinical Medicine, Medical Pathology, and Therapeutics), or (b) Surgery (including Clinical Surgery, Operative Surgery, Surgical Anatomy, and Surgical Pathology); and on one optional subject—Anatomy, Physiology, Pathology, Midwifery, Diseases of Women, Medical Jurisprudence, Ophthalmic Surgery, Aural, Laryngeal and Nasal Surgery, Dental Surgery, State Medicine, Psychological Medicine or Dermatology.

The fee is £30, except the candidate be a Licentiate of the Faculty, when it is £15.

The Fellowship Diploma is now open to Women.

POST-GRADUATION STUDY.

The different University Laboratories provide facilities for research work. In most cases no fees are charged, but those engaged in research work are expected to defray the expense of materials. The Laboratory of the Royal College of Physicians of Edinburgh is splendidly equipped for the carrying out of all branches of medical research. It is available for research work to Members and Fellows of the Royal Colleges of Edinburgh and to other applicants approved by the Council of the Royal College of Physicians. No fees are charged, and the ordinary reagents, etc., are provided. By arrangement with the Superintendent, workers may have the assistance of members of the Laboratory Staff. Special post-graduate courses may be arranged.

EDINBURGH POST-GRADUATE COURSES IN MEDICINE.

These courses, which are held during the Summer Vacation, are arranged by a Committee appointed by the University and School of the Royal Colleges. The programme for 1915 has not yet been drawn up, but will no doubt be somewhat similar to that for 1914, which was as follows:—

JULY:—A series of classes dealing with *Obstetrics and Gynaecology* (fee, Seven Guineas), and another series on *Diseases of Children* (fee, Five Guineas), were arranged for during the last fortnight of the month.

AUGUST:—A Four Weeks' Course on *Internal Medicine*. This included two clinics daily upon diseases of the various systems, in addition to classes upon Applied Anatomy, Haematology, Bacteriology and the Examination of the Heart, Urine, Digestive Products and Nervous System, X-Ray Diagnosis, and the Medical Aspects of Morbid Pregnancy. Between six and seven hours' instruction daily. Attendance limited to twenty-five. Fee, Ten Guineas.

SEPTEMBER :—A Four Weeks' *General Course*. Each fortnight was quite independent and might be taken separately. This included Medical and Surgical Clinics, Clinical Neurology, Dermatology, Fevers, Ophthalmology, Pediatrics, Infant Feeding, Applied Anatomy, Morbid Anatomy, Pathological Histology, etc. *Fee*, Five Guineas for the month or Three Guineas for either fortnight. A series of lectures upon subjects of general interest was given in connection with the course. These lectures were open to all practitioners.

A Four Weeks' *Surgical Course* included Surgical Clinics, Applied Anatomy, Surgical Pathology, Operative Surgery, etc. Attendance limited to thirty. *Fee*, Ten Guineas.

A Special Surgical Course during the second fortnight of September on the *Genito-Urinary Tract*. *Fee*, Six Guineas.

A Course on the *Ear, Nose, and Throat* (limited to ten) included classes on the pathology of this subject and operative work in addition to demonstrations on the methods of examination, clinics, etc. *Fee*, Ten Guineas.

A *Series of Classes*, the entries for which were limited, upon Hematology, Bacteriology, X-Rays, Gynecology, Gynecological Pathology, Ophthalmoscopy, Errors of Refraction, Ear, Nose and Throat, Histological Methods, etc. These classes were open only to those who had entered for the General, Surgical, or Ear, Nose and Throat courses, on payment of an Additional Guinea in each instance.

The various courses are attended by numbers of men which every year for some summers past have shown a steady increase. To ensure places for the limited courses it is necessary in some cases to enter at least three months before the beginning of the course desired.

In addition to these courses the classes throughout the year on Bacteriology, Diseases of the Blood, Diseases of the Tropics, Neurology, etc., are attended by a number of graduates.

Particulars of these classes are to be had from the Secretary, The New University.

GLASGOW ROYAL INFIRMARY AUTUMN POST-GRADUATE CLASSES.

These include Demonstrations on Diseases and Injuries of the Eye, Surgical Diseases of the Kidneys and Bladder, Clinical Medicine, Clinical Surgery, Diseases of the Ear, Diseases of Throat and Nose, Hematology, Gynecology, Practical Pathology and Bacteriology.

Those desirous of attending any of the classes are requested to communicate with Dr. Thom, Superintendent, Royal Infirmary, from whom a syllabus may be obtained.

EDINBURGH MEDICAL JOURNAL

EDITORIAL NOTES.

Medical Edinburgh
Fifty Years Ago.

WE lately chanced upon a series of "Letters from Edinburgh" published in the provincial correspondence columns of an erstwhile weekly London contemporary, a few extracts from which may not be without interest to our readers. The letters are unsigned, but they are so reminiscent of the *House Subscriber* that it requires little literary acumen to fix their authorship. Much water has flowed under the bridges since these letters were written in 1864, and medical Edinburgh has seen many changes in the half century that has elapsed.

It would appear, however, that in the matter of spring weather we still enjoy all the privileges of our ancestors, although happily we have been deprived of one of the consolations the prevailing variety brought them.

7 March 1864.

"My last contained a laudatory remark upon our climate. I regret to say it cannot now be repeated, as the rain seems never weary, the gutter of fatal fluid containing an emulsion of every filth imaginable, but by euphuism termed the 'Water of Leith,' is roaring a yellow flood under Stockbridge and discomfiting the unused fishing-boats at the harbour. Some regret this rainfall. I do not. The uncleaned streets are receiving their yearly washing; the heaps of filth which accumulate in our neighbourhood and are considered healthy are no longer to be seen, and perhaps fever may diminish in consequence. I had proposed to round this sentence off in a becoming manner, but was called out, and as I passed through Jamaica Street saw every drain-grating piled with bones, garnished with intestines of fish and other domestic contributions to the welfare of my profession."

Whether the state of the streets was as closely associated with the prevalence of "fever" as the writer suggests may be doubted, but if it was, the following paragraph shows that its contributions were not all to the welfare of the profession, and throws a lurid light on the conditions of dispensary practice amongst the poor of the old town.

"I wish to ask a question—How many resident medical officers in hospitals die every year? The mortality in Scotland has been very great. In one infirmary, I believe, *nine* have died in succession of fever. And, alas! how many of our clinical clerks die of it; and of those self-abnegating students who lodge the Cowgate and Westport, spend their money, their time, their lives, the happiness

of the homes they shall never more see, for dispensary patients? I intended to mention some names, but they are too many. No one will ever convince me that Providence intended such a waste of talent and good. Let the dead bury their dead. If Edinburgh *will* have fever, let her pay hardy strong men to doctor her. If students must learn that 'they can only watch the symptoms,' let them find out that suggestive fact in the Infirmary, surrounded by proper means for reducing the chances of contagion to a minimum."

Short racy notes on the work going on in the Infirmary indicate the subjects which were then attracting attention, and incidentally reflect the controversial atmosphere of the time.

"Mr. Syme has excised a knee-joint successfully. I was going to say something when my eye caught the 'Essay on Diseased Joints' lying before me, an essay which was published when your correspondent had not an articulation, vocal or mechanical. But considering the enmity shown to it for several years, his now performing the operation is the grandest tribute to its merit anyone has yet given. In doing so he has not contradicted one word in that remarkable essay; and I also believe it will do away with much bitterness between other great surgeons.

'Even the ranks of Tuscany can scarce forbear to cheer.'"

"Dr. Gillespie has removed the head of the femur, and it should be remembered that through good and evil report of the operation just alluded to he has steadfastly supported it."

"They tell me that Professor Simpson is publishing a work on acupressure. I have seen this plan tried and succeed, and I can only offer my affidavit that it stops bleeding, saves a great deal of trouble, and that whoever cuts my leg off is perfectly welcome to substitute pins for ligatures; indeed I think that I should prefer them."

"A singular accident was recently admitted to Dr. Gillespie's wards. A fisherman, when fishing off the 'Wild Tirie,' caught a conger eel about six feet long. The hook had been swallowed, so, calculating by the length of line where it was likely to be, Donald, like a judicious surgeon, cut down on it, and stuck his middle finger into the wound to grope about and find the hook, which he did; but just then the conger gave a wallop, the hook stuck in the back of his hand, and he was fixed, for the line was hanging out of the eel's mouth. The conger pulled him over the thwarts and bruised him sorely. His two comrades seized each leg and prevented him going overboard; but the enemy was the stronger, so they cut the line from its mouth, and away it went to sea, leaving poor Donald in a very sorry plight. Part of his hand has been amputated, and as he rubs the soap liniment on his aching ribs, vows that he 'wull na gang again to tat teevilish Tirie.'"

Commenting on a series of murder cases which had recently engaged the Law Courts in Edinburgh, the following case is cited to show the laxity which prevailed in those days with regard to the custody of dangerous lunatics:—

"Another case has been brought before Sheriff Gordon of a gentleman of property, who has a habit of walking about with a loaded gun on full cock, and firing, as the Yankees would say, 'quite promiscuous.' His manners are eccentric, and he cannot be persuaded to use a knife and fork. Besides the gun he carries a 'pocket pistol,' also loaded, and also used promiscuously. But he has been

and is, going about at large. He has not actually shot anybody yet, and when he does it will probably be—

‘Only a pauper whom nobody owns.’

But, after wandering at his own free will for a long time with the weapons I have mentioned, so soon as his relatives discovered that he was about to marry a pauper female with one eye, a ‘kick in her gallip,’ and an indifference to the narrow prejudices produced in this country by the decalogue, they at once called him into Court and endeavoured to prove him insane, because the estate might slip out of his idiot fingers into those of off-spring by his monocular love.”

The next extract refers to the days when the late King Edward was a student in Edinburgh.

“Prince Alfred must be rather tired of being King of Edinburgh. He is advertised, run after, and worshipped in a way which only a *missionnaire* could accomplish in the time. As he attends Playfair’s ten o’clock lecture, his admirers congregate about eleven. Shakspeare said something about *Divinity* hedging a *King*—why, I saw a whole class of divinity students hedging a Prince the other morning. Times are looking up for Royalty. *Time Regina!*”

By June the weather seems to have improved, and our author, forgetting the rain-swept streets of spring and all that they contained, and viewing his own romantic town from the broad bosom of the Firth of Forth, can only see “how lovely she is.”

“As for me, have I not written enough, and is it not perfectly justifiable that for a time I leave the schools, go down to Granton, and get some boy to row me out into the tideway, and so drift about as he just lets his oars dip now and then in the water? I look back on dear Dunedin and, with feelings for which there is no adjective, think of how lovely she is, and how *perdurable* in these streets glistening in the afternoon sunshine,

‘I have lost good days that better might be spent;
Have wasted nights in pensive discontent;
Have sped to-day, to be put back to-morrow;
Have fed on hope, and pined with care and sorrow.’”

THE Bronze Medal and Prize of Books presented to the College by Colonel William Lorimer Bathgate, in memory of his late father, William McPhune Bathgate, F.R.C.S.E., Lecturer on Materia Medica in the Extra-Academical School, was awarded, after a competitive examination in Materia Medica, etc., held for Session 1913-1914, to Mr. Lewis Windermere Nott, Edinburgh.

THE annual award of the Ivison Macadam Memorial Prize in Chemistry, consisting of a Bronze Medal and Microscope, was, after a competitive examination in Chemistry held for Session 1913-1914, made to Mr. Andrew Inglis Meek, Edinburgh.

EMPHYEMA IN CHILDREN.

By H. G. MELVILLE DUNLOP, M.D., F.R.C.P.,
Ex-Senior Physician, Royal Hospital for Sick Children, Edinburgh.

THE following paper is based upon 98 cases of empyema which were treated in my ward in the Sick Children's Hospital, and the observations and conclusions arrived at are drawn from an analysis of these cases. As an indication of the frequency of empyema in children I would point out that during the same period in which these cases occurred, 861 cases of pneumonia were treated in the ward, being a proportion of one case of empyema to every eight or nine cases of pneumonia.

The pleural fluid effused during childhood appears to have a marked tendency to be of a purulent character, and the younger the child the more pronounced does this tendency become. Indeed, it may almost be taken for granted when an effusion takes place into the pleura in a child under three years that it will be of a purulent character. In 59 cases of pleural effusion in children under three years old the fluid was purulent in 53, and in the other 6 it was either serum or turbid serum. I believe in the majority of these cases in which turbid serum was found, if they had been left for a few days instead of being aspirated and cured, that they would have become purulent, and ought therefore to have been classed as empyema, instead of being entered in the case-books as serous pleurisy.

After three years the liability to the fluid being purulent gradually lessens till the age of ten, when the tendency to a serous effusion is established in the great majority of cases.

These facts are strikingly demonstrated in the annexed table of 149 cases of pleural effusion.

Under 6 months, 3 cases all purulent.

Between 6 months and	1 year	9 cases,	8 purulent,	1 serous.
„ 1 year and	2 years	26	24	2
„ 2 years and	3	21	18	3
„ 3	5	23	18	5
„ 5	10	57	27	30
	Over 10	10	1	9

The fluid drawn off was invariably submitted to a bacteriological examination, and the results obtained are very similar to those of other observers.

The pneumococcus was present in pure culture in 53 per cent.

of all the cases. When the pneumococcus is accountable for the effusion, the pus is opaque and greenish in colour, of a thick, creamy consistence, and generally associated with large masses of fibrin.

Next in order comes streptococcal infection, which was present in 16 per cent. In such cases the pus was much thinner in character, and frequently on standing gave a whitish-grey deposit. In 14 per cent. the culture showed a mixed infection of streptococcus and pneumococcus. When this occurred the pus was often thin and watery at first, but became thicker later, owing to the pneumococcal infection. The staphylococcus alone was present in 3 per cent., and in two of the cases where it was found the pus had an offensive odour. The tubercle bacillus occurred in 3 per cent., while other forms and no growths occurred in 6 per cent. of the cases. The tubercle bacillus being difficult to find, I expect it was probably present in some of these cases where no growth was found. The fluid in the majority of these cases was of a turbid character.

These results are depicted in the accompanying table:—

In 53 cases the	pneumococcus	was present alone.
„ 16 „ „	streptococcus	„ „
„ 14 „ „	pneumococcus and strepto-	
	coccus	were „ mixed.
„ 3 „ „	staphylococcus	was „ alone.
„ 1 „ „	staphylococcus and pneumo-	
	coccus	were „ mixed.
„ 2 „ „	staphylococcus, streptococcus,	
	and pneumococcus	„ „ mixed.
„ 3 „ „	tubercle bacillus	was „ alone.
„ 6 „ „	no growths	were „

In determining the causation of empyema in children, it is frequently stated that it occurs in two forms, viz. the primary and secondary, and that primary forms are by no means uncommon.

While admitting the occurrence of primary forms due either to cold or injury, I believe that in the majority of cases the condition is a secondary one and that primary cases are exceptional. Of course, it may be argued that in hospital practice, with the exception of cases developing in the course of a pneumonia, the physician does not have an opportunity of seeing the commencement of the effusion, but we almost invariably got the history of some lung or other antecedent trouble. In only 7 per cent. of my cases did I fail to find some such history, and even in these

the origin must remain in doubt, as there are so many channels through which infection may take place.

In the majority of cases the effusion either occurred with or followed lobar pneumonia, and when such was the case the fluid was invariably purulent. Empyema, according to my statistics, was much less frequently associated with broncho-pneumonia. It frequently developed subsequent to an attack of scarlet fever, measles, whooping-cough, and occasionally after influenza. Any suppurative process such as a purulent arthritis or an osteomyelitis may account for it, and in young infants septicaemia is a common cause. In striking contrast to empyema in the adult we only find a very small proportion in children due to tubercle. The causations in my cases are set forth in the annexed table:—

Lobar pneumonia	.	.	.	69 per cent.
Infectious diseases	.	.	.	11 ..
Broncho-pneumonia	.	.	.	5 ..
Suppurative processes	.	.	.	3 ..
Tubercle	.	.	.	3 ..
Influenza	.	.	.	2 ..
Causes unknown	.	.	.	7 ..

In most of the cases in which I had the opportunity of watching the development of the disease, the effusion occurred in cases of pneumonia within a few days of the crisis. Sometimes the symptoms heralding the onset of empyema were acute and violent, while in other cases the symptoms were more insidious and indefinite, and the illness developed gradually. I have never been quite able to grasp the significance of the cases described as latent empyema, unless the term is meant to apply to cases developing gradually. Some years ago I was greatly impressed on reading an article on empyema by a writer, whose name has escaped me, that latency in empyema was synonymous with carelessness in the physician. With this remark I cordially agree, and I think that every physician attached to a children's hospital will confirm the truth of this statement. Very frequently has it been my experience to have a child, generally a young infant, sent to me with the diagnosis of atrophy or miliary tuberculosis, and the general appearance went far to confirm such a diagnosis. We found the infant in the last stages of emaciation, virtually a bag of bones, with a dry, harsh skin, a peevish cry, and an appearance of intense exhaustion, but on making an examination of the chest we found it full of pus.

Probably the history is, that some months or weeks previous the child had been treated for an attack of pneumonia, which had passed off, but instead of making a satisfactory convalescence it had progressively wasted. The physician in attendance was probably quite able to diagnose empyema had he taken the trouble to examine the chest, but relying on his previous diagnosis he had failed to do so, and thus fallen into error. The lesson to be learned is, that it ought to be a routine practice to examine, from time to time, every case we are attending which is not making satisfactory progress. I imagine there are few of us who at one time or another have not been guilty of a similar mistake. In six cases of young children an attack of convulsions was the earliest indication of the onset of empyema, while the other symptoms in the order of frequency were fever, cough, vomiting, quick breathing, sweating, restlessness, and delirium. When the disease attacked older children, and especially was this liable to occur after infectious diseases, the foregoing symptoms were less pronounced, but the child gradually assumed a languid appearance, became peevish and had an anxious, careworn look, suffered from a short paroxysmal cough, and emaciated rapidly. In my series there were 53 boys and 45 girls. The left side was involved 45 times, while right-sided effusion occurred in 39 cases, which is not at all the usual proportion, or what we would expect from the frequency with which left-sided pneumonia occurs. Both sides were involved in 4 cases, which is, I think, about the general average. The amount of fluid varied greatly both in the quantity (from three-quarters of an ounce to 40 ounces) and in the time it took to gather. In some of my cases I found one side of the chest filled with pus from apex to base in the space of a few days, while in others the effusion took a very much longer time to collect. When a purulent effusion has taken place into the pleura, there are a number of symptoms which are very suggestive of the condition. First and foremost I would emphasise the statement, that in almost every case the child looks seriously ill. It is surprising with what regularity succeeding residents have noted this fact in their case records. Whatever else they have omitted, they have almost invariably stated that "the child looks very ill." Not only does he look very ill but he has an anxious, pinched, almost frightened expression, and is profoundly anæmic. The pallor of the skin of the face is very marked, sometimes of an earthy colour, at other times of a straw-yellow tint, and often accompanied by some puffiness round the eye suggestive of Bright's

disease. The exudation of pus into the pleura is almost invariably accompanied by very rapid and sometimes extreme emaciation. This symptom is seldom wanting, and I regard empyema as one of the most characteristic of the wasting diseases of children. When a child is sent to me as suffering from marasmus I always exclude three diseases, viz. tuberculosis, congenital syphilis, and lastly empyema, before coming to the conclusion that the diagnosis is correct. The muscles become flabby and wasted, and the child appears prostrate, exhausted, and suffering from extreme cachexia. There is usually some cough, either suppressed or paroxysmal in character, and the breathing is accelerated, but never to the same extent as we find in pneumonia. Indeed, it is surprising even when the pleura is full of pus how little real dyspnoea we find. There is generally a rise of temperature of from three to four degrees, and it may be very high, but on the other hand, especially in cases where the emaciation is marked and in young infants, there may be no rise of temperature at all, and it may even be subnormal, which is a very misleading sign. In ten of my cases there was either a normal or subnormal temperature during the whole period the child was under observation. When an empyema has lasted a long time without being operated on there is often clubbing of the fingers, and I have on one or two occasions witnessed these symptoms after a few weeks. A leucocytosis of from 20,000 to 30,000 is generally present when the fluid is purulent. Occasionally we find the cheeks flushed and the child perspiring, but more often the skin is pale, dry, and harsh. It is often mentioned as helpful in the diagnosis that we find diarrhoea, but my experience does not bear out this statement, and few of my cases suffered from this symptom. Such, then, are the symptoms characteristic of empyema, and they form a very striking clinical picture. I shall refer very briefly to the physical signs, but there are one or two points I would like to emphasise, for though they have frequently been written about they will bear repetition. The first point I would like to make is that whenever we find absolute dulness of a boardy character at the base, accompanied by a boxy percussion note at the apex, we should suspect a pleural effusion, especially if we get loud, harsh, exaggerated breathing above the region of dulness and on the opposite side. The sense of resistance communicated to the percussing finger is another point of great value in children, but it requires some practice to appreciate the full significance of this sign.

I would further like to lay stress on the fact that it is quite

common to get loud tubular breathing over a purulent effusion in the child. To those who are only familiar with the interpretation of physical signs in the adult this finding in the child is very misleading, but everyone associated with a children's hospital knows how commonly either loud or distant tubular breathing is present in these cases. Vocal fremitus is of little help in children, the vibrations of the voice being of too rapid a character to be perceptible to the human hand. There is of course deficient expansion on the affected side, and in many of my cases there was marked flattening, due, I suppose, to collapse of the lung. Owing to the uncertainty of many of the physical signs, displacement of the heart's apex is a very valuable aid in the diagnosis of fluid in the chest. This displacement is more marked in left-sided effusion, and when a considerable quantity of fluid is present we may find the apex beat in the epigastrium, or even as far out as the right mammary line.

The complications of empyema are generally the result of further pneumococcal infection.

By far the commonest complication was purulent pericarditis, which was present in 40 per cent. of the fatal cases. It was most frequently associated with left-sided empyema in young infants. This condition was frequently only suspected, and as frequently altogether undiagnosed during life, as friction was seldom if ever detected, and the percussion area of cardiac dulness was little altered, owing to the small amount of pus present in the pericardium. Pericarditis should always be suspected after operation when the pleura is draining freely, if the child continues to look ill, with an anxious appearance, when dyspnoea is present, and the pulse continues rapid. Purulent meningitis and purulent peritonitis occurred several times, but I had no cases of either suppurative arthritis or general septicæmia.

The diagnosis both as to the presence of effusion and the nature of the fluid is frequently difficult and sometimes impossible without the aid of an exploring needle, and fortunately the employment of this measure is attended with little risk, and whenever there is a patch of dulness which does not clear up it should be had recourse to.

When there is a reasonable certainty that pus is present the needle may have to be passed repeatedly before the fluid is struck, and in some cases even then it is of too thick a consistence to pass through the needle, while in other cases large masses of lymph block the lumen and prevent the passage of pus. The signs of the

presence of fluid on which I place most reliance are displacement of the heart, dulness of a wooden character accompanied by a sense of resistance on percussion at the base, and surmounted by an area in which we get a tympanitic note. The auscultatory signs are in my opinion of much less value than those obtained by percussion in determining the presence of fluid.

To discriminate between a purulent and serous fluid is often impossible, though there are many signs which favour the presence of pus rather than serum. It is frequently taught that a hectic temperature is indicative of pus, but I find as high temperatures recorded in my serous as in my purulent cases. When an effusion occurs in a child under three, the probability is strongly in favour of its being purulent, as also when it occurs subsequent to an attack of pneumonia, scarlet fever, or other infectious disease. Other symptoms in favour of pus are great emaciation, sallow tint, pallor of the skin, puffiness under the eyes, and a marked leucocytosis. The difficulty of differentiating an empyema from a pneumonia is immensely greater in the child than in the adult.

In the child we have no expectoration to help us, and, as already indicated, vocal fremitus is of little value. When to this is added the fact that we frequently have loud tubular breathing over an effusion, the value of an exploring syringe as a diagnostic help will be appreciated. The diagnosis between a chronic caseous pneumonia and an empyema, both of which give the same dulness and feeling of resistance on percussion, is frequently hopeless without exploration.

The prognosis of pleural effusion in children is rather difficult to estimate, as the mortality from the disease is largely determined by the cause and duration of the illness and the age of the child.

In 98 cases I had 20 deaths, a mortality of 19 per cent. Under 2 years the prognosis is very grave, for in 30 cases I had 11 deaths, a mortality of 36 per cent. At this age children seem to be specially liable to develop purulent pericarditis and meningitis, which are very fatal complications. After 2 years there is a very marked diminution in the mortality, and in 68 cases I had 9 deaths, being a death-rate of 13 per cent. When the effusion is double the outlook is most serious, for out of 4 cases only 1 recovered, but all these cases were in young infants. Pneumococcal cases over 2 years almost invariably recovered, whereas in streptococcal and mixed infections the prognosis was not nearly so good.

Thus out of 10 deaths over 2 years only 3 deaths occurred in

pneumococcal cases, whereas the other 7 deaths were due to cases caused by other infections. Tubercular empyema is fortunately a rare occurrence in the child, and when it does take place the prognosis is not nearly so unfavourable as in the adult. Though the immediate outlook is not nearly so bad, the risks of a further tuberculous development must be borne in mind. The longer operation is deferred the worse the prognosis, as there is the added danger of the lung not expanding. The usual causes of death are bronchitis, broncho-pneumonia, pericarditis, peritonitis, and septicæmia.

It should be a cardinal rule that as soon as we recognise the presence of pus in the pleural cavity, it should be evacuated at the earliest opportunity. Success in treatment depends largely upon its early removal, and if we can secure good drainage and keep the cavity free from sepsis, the risks of complications occurring are greatly diminished. I believe that the earlier the evacuation of the chest takes place the less chance is there of the development of purulent pericarditis and meningitis, which I consider are in the main due to the long continuance of pus in the pleural cavity. In most cases any attempt to relieve the effusion by aspiration is a dangerous waste of time, and is by no means an efficient method of treatment, but there are exceptions to this rule. In cases where the exploring syringe has drawn off turbid serum—by which I mean serum charged with pus cells—I have frequently aspirated with excellent results. Then, again, it should be tried in very young infants who are unable to stand a serious operation. Aspiration is also useful when the effusion is very large. It may in such cases be had recourse to on the day previous to incision, so as to avoid the danger of syncope due to the sudden evacuation of a large quantity of fluid. In small localised collections of pus it is also recommended, but I have had no experience of such cases. The objections to aspiration are that by this means we cannot remove all the pus, that large masses of fibrin are left; we get no drainage, and have generally to resort to other measures later. As a rule our choice lies between resection of a portion of rib and simple incision of the pleura, and there are points in favour of each method. By the excision of a portion of rib we undoubtedly get better drainage and less risk of sepsis, but on the other hand it is a more serious operation, takes longer time, and causes greater shock. Incision of the pleura is a very simple and easily performed operation, is followed by little shock, and the drainage is usually sufficient. This method is specially indi-

cated in young infants, and should the drainage prove defective or the discharge become offensive, resection can always be performed later. For many years it was my practice to have all my cases resected, but latterly I have had equally good results from simple incision.

8 cases were aspirated with 1 death.

61	..	..	resected	..	14 deaths.
29	..	..	incised	..	5 ..

It should be an invariable rule to ascertain the presence of pus before operating by inserting an exploring needle even though pus may have been obtained on a previous occasion. The main danger of the operation is syncope and death from the anæsthetic, and it is safer in young children to trust to a local anæsthetic. I had one death on the operating table in a young infant. The main indications are to have a free incision and good drainage. The incision should be made in the 6th interspace in the mid-axillary line, and should be two or three inches long. When the chest is full of pus it is better, after incising the pleura, to insert the drainage tube at once and apply the dressings, by this means allowing the pus to escape gradually and thus avoiding a too rapid emptying of the pleura. In the majority of cases I believe the tube is left too long *in situ* and causes a discharging sinus. In many cases it can be removed in a week or ten days, and as a rule does not require to be retained longer than 3 or 4 weeks. In the cases which were resected the average time the tube remained in the wound was 28 days, whereas when simple incision was practised the average time was 36 days.

A NEW ROUTE OF INQUIRY AS TO THE NATURE AND ESTABLISHMENT OF THE TYPICAL SEX- ENSEMBLE IN THE MAMMALIA.

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"*La Nature est intentionnelle dans son but, mais aveugle dans l'exécution.*"—

CLAUDE BERNARD.

I.

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1. PRELIMINARY.

A FEW words must be allotted to the question of the object of this inquiry. It is not, strictly speaking, an inquiry into the origin of sex in the mammalia, as sex had been established long before the appearance of this division of the animal kingdom, if we accept, as we must, the sex gland and its heredity cells as the final and only criterion of sex. What is here specially considered is the evolution of the *sex-ensemble*, i.e. of that portion of the body known as the urogenital tract when developing ontogenetically, or as the urinogenital tract when actually formed, with the secondary sexual characters.

The *sex-ensemble* thus comprises not only the sex glands, but the duct portion of the tract, the opposite sex-duct elements and the secondary bodily and psychical conditions associated with the *sex-ensemble*.

This distinction between *sex* and *sex-ensemble* must be kept in mind, otherwise confusion will arise. It must therefore be specially noted on this distinction that the question of sex, its nature and origin, will arise only incidentally, but that the origin and nature of the *sex-ensemble* is the broad subject to be considered.

In the mammalia the organs concerned with reproduction have been most thoroughly investigated in the human male and female, but less accurately and fully in other mammals. In all mammalia it is the potent or characteristic organs that have been most fully examined. The genital organs contain, however, traces of an opposite sex-duct element, and thus the whole tract is like a clearly-written manuscript with a palimpsest portion, a partially erased section, hitherto little studied but of the greatest significance. It is thus to the potent urogenital tract, to the partially erased portion, to the secondary sex characters, and to the mammæ that I apply the term *sex-ensemble*. We must regard a mammal as made up of a soma and a sex gland containing the heredity cells and certain accessories. The soma is for the individual alone, while the future progeny are derived from the union of the reduced heredity cells. It is the union of these in the shape of gametes that gives rise to the fertilised ovum which is to express the heredity of the strain and of the race, and we must therefore, in the first place, consider how these heredity cells arise, how heredity is expressed in them and how variation, their great manifestation and result, is brought about.

As the zygote (fertilised ovum) is formed by the union of two gametes, female and male (ordinary ovum and spermatozoon), and as these are derived at maturation from the heredity cells when the polar bodies on each side are thrown off, we must now go on to consider

2. THE ORIGIN OF THE HEREDITY CELLS: THE MALE AND FEMALE GAMETES.

By *heredity cells* we mean cells of that part of the zygote early set aside to form the primitive germ-cell mass. These travel through the developing embryo as early as the germ layer stage, and ultimately reach the genital ridge on the Woltian body and form with it the sex gland. When the heredity cells are thus *introduced* into the somatic part of the sex gland they form with it either an ovary or testis. In the ovary they are then termed oöcytes; in the testis, primitive sperm cells.

It is probable that in each sex there are two kinds of heredity cells, with the same number of chromosomes respectively. For reasons given afterwards they may be called in each sex Woltian

and non-Wolffian heredity cells. When the heredity cells at maturation have only half of their chromosomes prior to fertilisation they are gametes.

It was van Beneden who first described the fact that the fertilising gametes had their chromosomes reduced to one-half by the loss of what were termed the polar bodies. This loss, known as "maturation" or "ejection of chromosomes," was a discovery of prime importance.

When the heredity cells reach the sex glands mitosis begins, and its nature will be discussed presently. The discussion as to the origin of the heredity cells has been long and keenly carried on, but thanks to the work of Richard Owen, Eigenmann, Beard, Boveri, Lewis, Allen, King, Rubaschkin, and the advocacy of A. Keith, Felix, J. W. Jenkinson, the author, and others, the early zygotic origin is now supplanting the germ epithelium view. The view of the zygotic origin of the heredity cells is one of the greatest advances made in embryology, and clears up questions of heredity in a more simple manner than formerly.

The origin of the heredity cells from the germ epithelium of the ovary makes the former, with the determinants, arise from a somatic cell which has only determinants for its own class of cell. It makes the whole body of the adult somatic instead of the sum of the sex gland and the somatic part of the body.

This zygotic origin is further of prime importance, inasmuch as it is held by many that a somatic variation due to environment, etc., will be conveyed to the progeny. It can only so pass by first being made causal in the germ plasma, and there has as yet been described no mechanism by which a somatic variation can be made causal in the heredity cells.

3. WEISMANN'S VIEW AS TO DETERMINANTS OF ZYGOTE.

We may regard the part of the zygote set aside for the soma as containing the determinants for the body organs.

The heredity cells not only differ in their determinants, but are of two kinds. The one has Wolffian body determinants, the other none—the Wolffian and non-Wolffian heredity cells. The Wolffian relics differ in each sex, as the testis has more Wolffian than the ovary. When fertilisation takes place, it is either the union of a Wolffian male and a non-Wolffian female gamete giving a male zygote, or of a non-Wolffian male and a Wolffian female

gamete giving a female zygote, and thus sex is determined at fertilisation.

In the nucleus of the heredity cells we have the chromosomes, and their electrons* are to be considered as being Weismann's determinants. There are no strict sex determinants in the chromosomes of the zygote. The heredity cells are, however, lodged ultimately in the genital ridge of the Wolffian bodies, and these latter differ in the two sexes in the portion they give to the formation of the sex tract. Thus in the male we have the whole Wolffian duct becoming the vas deferens, whereas in the female the Wolffian tubules and duct are only represented by the epoöphoron, the duct itself being rudimentary. Then, again, in the testis some of the Wolffian tubules become effective parts of its structure.

MATURATION.

In maturation, determinants are thrown off so that only one half remains. Those thrown off may be regarded as mainly ancestral with a few immediate; those retained as mainly immediate with a few ancestral. There are no direct sex determinants, *i.e.* determinants for the oöcytes and sperm cells in the somatic part of the zygote, actual sex being due to the sperm cells and germ cells from an early division of the zygote, and these migrate, as already described, until they become lodged in the genital ridge, and ultimately in the ovary or testis. Thus the heredity cells themselves, when in the sexual gland, determine the sex. If we have non-ciliated heredity cells in follicles, the sex is female; if motile and in tubuli, the sex is male.

With each sex there is, in mammalia, associated a typical duct system; in the female for the downward passage of the ovum, for the reception of the male seminal ejaculation, and also for the development and ultimate expulsion of the developed fetus; while in the male there is an excretory duct for the passage of spermatozoa, and an intromittent organ with accessory glands for sexual congress. Whether the vesiculae seminales store the sperm cells is not as yet accurately settled.

In each sex there thus is a potent or normal genital tract, and a non-potent or opposite sex-duct element. The latter are *in the female*, the epoöphoron and paroöphoron: *in the male*, the hydatid testis and prostatic utricle (see Plate I., Figs. 1 and 2).

* See section 14.

PLATE I.

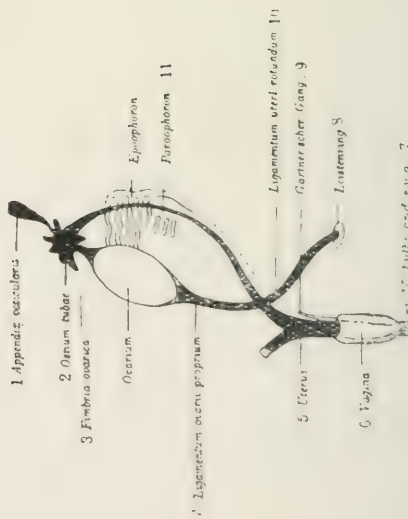


FIG. 1.—*Tiphia* female scorpionfly (modified from Bonnet). Shows (1) Secondary genitalia; (2) Patent portion—Tubus, uterus, vagina and external genitalia; (3) Non-patent or apposite secondary character—Epiphoron and paramphoron 11; secondary sex characteristics not indicated (see pp. 17 and 18).

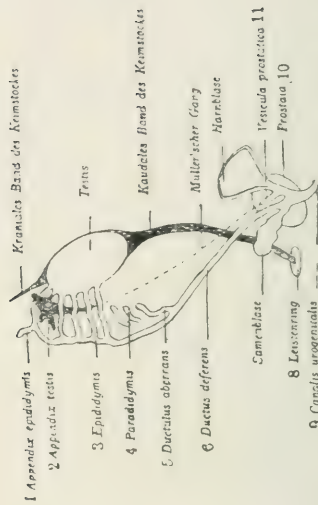


FIG. 2.—*Tiphia* male scorpionfly (from Bonnet). Shows (1) Secondary genitalia; (2) Patent portion—Vas deferens and epididymis, submembranum; (3) Non-patent or apposite secondary character—Hydathal testis, postate article 11; secondary sex characteristics not shown (see pp. 17 and 18).

4. THE UROGENITAL ORGANS EXERCISE THE FUNCTION OF SEX, AS THE HEART AND BLOOD-VESSELS, FOR INSTANCE, CARRY ON THAT OF THE CIRCULATION OF THE BLOOD.

A special system of the body, the urogenital, is set aside in mammalia for the function of sex, just as we have special systems formed in the soma for the cardiac, respiratory, digestive, and intellectual processes. The urogenital organs, characteristic for each sex, form for reproduction that system in mammalia, and it is the phylogenesis of this system that is the key to the question of sex and of the sex-ensemble.

We must speak, however, of the characteristic *sex-ensemble* instead of the characteristic "sex." * By the term "*sex-ensemble*" one understands not only the actual sex gland and its potent ducts, but also the opposite sex-duct elements; the mammae, type of pelvis and body, arrangement and distribution of hair, and special psychical qualities. There is no more reason for believing that the typical *sex-ensemble* in mammalia is suddenly developed at fertilisation than that the same happens to a four-chambered heart or to a human brain. Each has its long-drawn-out phylogeny, and its ontogeny is the culmination of this in the special organism whose development is being considered.

We have now to take up, mainly from a morphological aspect, the nature of the genital tract in the human female and male.

5. WHAT MAKES UP IN DETAIL THE TYPICAL SEX-ENSEMBLE.

It comprises the following structures in each sex:—

The Typical Female Sex-Ensemble.

Potent.—Ovary, uterus, tubes, vagina, hymen, external genitals.

Non-potent or Opposite Sex-Duct Elements.—Epoöphoron and paroöphoron.

Secondary Sexual Characteristics.—Mammæ, characteristic pelvis, pubic hair distribution, larynx, special psycho-sexual development (Plate I., Fig. 1).

The Typical Male Sex-Ensemble.

Potent.—Testes, vas deferens, phallus.

Non-potent or Opposite Sex-Duct Elements.—Hydatid testis, prostatic utricle (Plate I., Fig. 2).

* One uses urogenital as embracing the Wolffian bodies, their ducts, and urinogenital sinus, while the urinogenital organs are the fully-formed organs, and arise from the former (see as to exact origins, p. 23).

Secondary Sexual Characteristics.—Characteristic pelvis, distribution of pubic hair, mammae, larynx, psycho-sexual attributes.

In each typical sex-ensemble the potent or characteristic organs are at their maximum, the opposite sex-duct elements at their minimum; the secondary sexual characters congruent. Any ratio disturbance of this makes an atypical sex-ensemble.

6. THE DEVELOPMENT AND ORIGIN OF THE FEMALE URINOGENITAL TRACT, AND OF THE OPPOSITE SEX-DUCT ELEMENTS IN IT.

The foundation of the urinogenital tract is the excretory one known as the Wolffian system, made up of the pronephros with its duct, the pronephric duct—both practically gone—and the mesonephros and its duct, usually termed the Wolffian duct—both fully represented in the early embryo.

The Pronephros with its Duct.—It would be out of place to trace the phylogeny of this system. In the human embryo it is occasionally seen as a depression at the cephalic end of the Wolffian body with a short duct. Its duct may be the ancestor of the Müllerian duct, but this is uncertain.

The *mesonephros or Wolffian body proper and its duct* are present in the early human embryo and act as temporary kidneys, although this is disputed, until the true kidney and its ureter (metanephros and duct) are developed, mainly as an outgrowth from the Wolffian duct.

On the Wolffian body there early develops a special longitudinal thickening continuous with the colomic epithelium, the genital ridge, and the latter with certain parts of the Wolffian body make up the somatic portion of the male and female sex gland.

The Wolffian duct opens in the embryo into the urinogenital sinus below the eminence of Müller, the blind end of the Müllerian ducts, as can be well demonstrated in serial sections of a six-weeks' female embryo.

It must, therefore, be strongly emphasised that the pronephric and Wolffian bodies and their ducts are the foundation of the genital system in mammals, and that their non-development or loss will profoundly modify it.

In the genital ridge of the Wolffian bodies the ovary and testis arise and contain the well-known oöcytes and sperm cells—the former in follicles, the latter in tubules—as has been already considered (pp. 14, 15). In the case of the oöcytes, Graafian follicles form round them. Before this stage they are primitive

oöcytes with an envelope of spindle cells surrounding each of them.

The nucleus of the heredity cell contains the chromosomes in the shape of microscopic rods, which stain readily with aniline dyes, and have Weismann's determinants of heredity in them. It is the chromosomes that are the active part of the nucleus, as we shall see when we take up the questions of mitosis and maturation. The rôle of the cytoplasm is not settled.

The *Fallopian tubes, uterus, and vagina* arise from the Müllerian ducts. These are two in number, one on each Wolffian body, but become differentiated afterwards by disappearance or persistence of their septal walls into the Fallopian tubes and a single uterus and vagina (in the human female). Their phylogeny is obscure, but if they are not pronephric in origin each is most probably a modification of such a primitive duct system, as the pronephros in lower organisms communicates with the coelom above and the urinogenital sinus below.

The actual Müllerian ducts in the human female arise as a thickening of the coelomic epithelium on the mesial or lateral aspects of the Wolffian bodies in 7.5 mm. embryos.

In the human embryo the Müllerian ducts open at first blindly at the Müllerian eminence on the posterior wall of the urinogenital sinus above the patent orifices of the Wolffian ducts proper.

The lowest third of the vagina is formed from the urinogenital sinus along with the lower ends of the Wolffian ducts, and the latter develop the hymen. The upper two-thirds are Müllerian.

The question of the origin of the vagina and hymen may, however, be discussed more fully.

The usual view is that the vagina and hymen are derived entirely from the ducts of Müller, while all that represents the urinogenital sinus, apart from what gives rise to the urethra, is the vestibule. In the six weeks' foetus, however, the urinogenital sinus is very long, and one has also to account for the multilayered lining of the vagina. The early embryo after the fourth week has the ducts of Müller coalesced, and the lining of the future vagina is of a low columnar type.

Quite a new aspect was given to this question when it was found that about the third month the vaginal lumen was solid (Klein, Nagel), and that at the future site of the hymen there was a bulbous proliferation of epithelial cells of the type found

in the adult vagina. In investigating a female foetus at the third and a half month I found two distinct and lateral bulbs composed of a similar epithelium and traced the Wolffian duct into one of them. The Wolffian duct is of ectodermal origin (Kollmann), and thus the hymen is really an organ of the urinogenital sinus and of Wolffian duct origin. Strange to say, I found quite a similar bulb in the prostate of a four-months' male embryo in a line with the vas deferens.

The nature of the vaginal and vestibular tract I believe to be as follows:—The upper two-thirds of the vagina are Müllerian, the lower third urinogenital sinus, while the vestibule is also derived from the urinogenital sinus.

As corroborative of this it may be noted that the lymphatics of the lower third of the vagina pass to the groin glands, those of the upper two-thirds go with the uterine ones. The muscular, nervous and blood supply of the lower vaginal third also differ from that of the upper two-thirds.

In the three and a half months' vagina there is no lumen, but the lumen is filled up with cells bordered by a narrow clear line. These blocking cells are continuous with those in the bulbs, and evidently these bulb-cells have passed into the Müllerian canal and absorbed the primitive low columnar epithelium. This irruption passes up as far as the lower part of the cervical canal, and ultimately desquamates centrally, so that the ultimate vaginal lumen is thus formed. Those who hold to the entire Müllerian origin suppose that the primitive epithelium becomes changed into a squamous form.

Origin of the Bladder and Urinogenital Sinus.—By a ventral unfolding of the caudal blastoderm in the 2 mm. embryo we get the lower part of the primitive gut, the entodermal cloaca and tail-gut, formed. The former, the pars penultima, becomes, by a coronal partition dipping from above, divided into two parts, the anterior forming the bladder, the posterior the future rectum. The allantois takes no part in forming the bladder, although it is traditionally held in respect by many anatomists and used as the *deus ex machina* in extroversio vesicae, but only the fundus vesicae may be considered as allantoic. There is no free or vesicular allantois in the human embryo, and it is only represented in the umbilical cord by an imperfect duct near the navel.

The *tail gut* (pars ultima) disappears early, but I have recorded a unique case where it was present attached to the anterior aspect of the perineum of a healthy female child. It was in appearance

like a scrotum, had an aperture on its anterior aspect, and was lined with Lieberkühnian follicles. This shows that the tail gut has also a cloacal membrane. The tail gut may be called the *pars ultima* of the primitive gut.

The *urethra* in its upper part is derived from the urinogenital sinus. The lower part is blocked, like the vagina, by a proliferation of epithelium from the Wolffian bulbs, and is retunnelled like the primitive hymeneal site. The urino-genital sinus thus forms the urethra, the lower third of the vagina and the parts inside the labia minora, viz., the vestibule and the part of the fossa navicularis between the fourchette and hymen, the former being due to the junction of the lower ends of the labia minora.

The Cloacal Membrane.—When the *pars penultima* of the primitive gut is formed, its anterior mesial line, in direct descent, probably from the gastrula pore and neurenteric canal, closes in at its ectodermal aspect, and then mesoderm grows in to complete the bony and muscular ring. The ectoderm alone may be present or all the layers may be absent, a defect which, when complete in its linear extent, gives rise to *extroversio vesicæ*. Minor amount of non-union gives *epispadias*.

The *hymen* is not the thinned-out ends of the Müllerian ducts, but is due to a bulbous epithelial proliferation of the lower ends of the Wolffian ducts; the coalescence and central breaking up of the bulbs aided by an involution from below forms the vertical slit-like entrance of the hymeneal aperture.

There are other normal structures in the female genital tract which must now be considered.

The *broad ligaments* represent the greater part of the Wolffian bodies.

The *ovarian ligament* is the equivalent of the caudal ligament of the testis seen in the early male embryo while the testis is still undescended.

The *round ligament* is the equivalent of the gubernaculum testis at the stage when the testis is still abdominal.

The *rudimentary structures* between the layers of the broad ligament—the epoöphoron and its duct and the paroöphoron—will be considered presently.

In a certain proportion of cases *suprarenal tissue* is found in the broad ligaments and near the testis.

It is interesting to note that in *chrysemys* embryos a number of heredity cells pass dorsad above the root of the mesentery until they come to lie in the loose mesenchyme immediately

beneath the aorta and often slightly to either side of the anlagen of the adrenal bodies (Lewis). This means, then, that in the so-called descent of the testes in which the heredity cells lodge, the suprarenal may in part also descend. This descent is not constant but occasional, in this differing from the constant co-existence of the epoöphoron with the ovary. It has also been found that the upper limit of the migration of the heredity cells is at the pronephros, and its descent as the hydatid testes is thus better understood. It indirectly confirms the origin of the fimbriated end of the Fallopian tube from the pronephric funnel as F. M. Balfour and A. Keith have stated.

*The Opposite Sex-Duct Elements in the Typical Human
Female Genital Tract.*

In the human female genital tract there are present not only the organs characteristic of the *sex-ensemble*, but also those that are the degenerated analogues of certain parts of the male genital tract where they are fully developed. The former have been termed the potent organs, the latter the non-potent, or, more exactly, the opposite sex-duct element. The latter are degenerated segmental tracts or parts, analogues to those normally developed in the male genital tract, and are known as the epoöphoron (parovarium) and its duct, and paroöphoron-tubules lower down at the hilum ovarii.

Since these opposite sex-duct elements in the genital tract were first pointed out by Rosenmüller in 1802 and Kobelt in 1847, little has been done in the way of their investigation, but there have been notable additions to our knowledge by Gartner of Copenhagen (1824), Numan of Utrecht (1843), Meyer of Berlin (1897-1913), Arthur Keith, and Alban Doran. Rosenmüller's account is excellent and his figures of the epoöphoron accurate.

Kobelt gives a valuable description of the opposite sex-duct elements, and an interesting account of atypical sex in a goat (a male really), not one of twins apparently, and where the testes had descended. His drawings, which are very fine, have been repeatedly copied in text-books.

Gartner's description of what is known as Gartner's canal I have already given from Numan's work. Meyer of Berlin has written comprehensively (1897-1913) on the subject of the representation of Gartner's canal—the Wolffian duct—in the human fetus. Plate II., Fig. 1, shows its relation to the vagina and uterus schematically, while Fig. 2 gives a case where it ended in the

PLATE II.

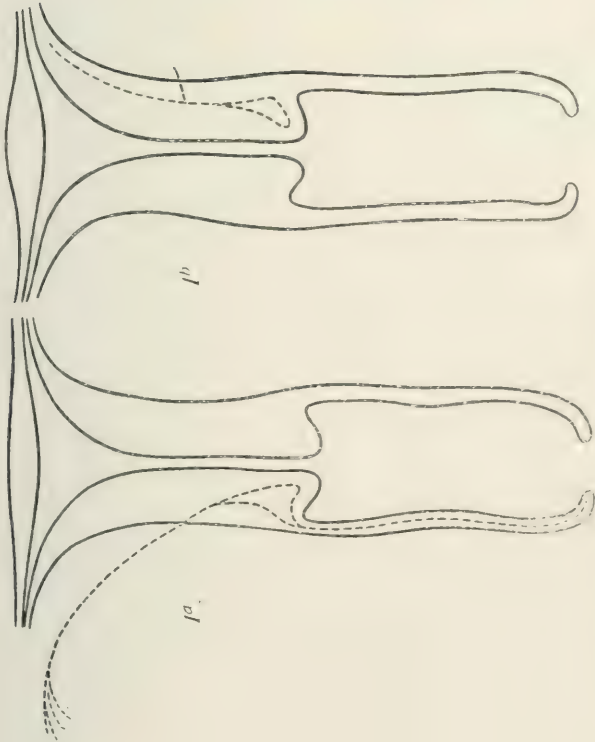


FIG. 1. Schematic horizontal section through the ear canal. The external auditory meatus is shown as a dotted line in the middle of the canal. The ossicles (malleus, incus, stapes) are shown as solid lines. The ear canal is shown as a solid line. The ear canal is shown as a solid line. The ear canal is shown as a solid line.



FIG. 2. Longitudinal section through the middle ear. The ossicles (malleus, incus, stapes) are shown as solid lines. The surrounding structures are shown as dotted lines. The diagram is labeled with 'H.E.' and 'H.B.' at the top, and 'H.B.' at the bottom.

hymen, an interesting fact in relation to the view I have advanced as to the origin of the hymen from the Wolffian ducts and not from the Müllerian, as is generally held.

Numan found great difficulty in tracing Gartner's ducts in sheep, as they are, so far as is yet known, little developed. He used mercurial injections to demonstrate them in the cow. It is this opposite sex-duct element that is the almost completely obliterated palimpsest of the genital tract—with a complete understanding of its nature is linked the clearing up of the nature of the normal *sex-ensemble*. We may now give the developmental origin of the urinogenital system.

SUMMARY OF SOURCE OF FEMALE GENITAL ORGANS.

ORGANS.	SOURCE.
Heredity cells.	Early division of zygote.
Somatic part of ovary.	Genital ridge and connective tissue of Wolffian body.
Fallopian tubes, uterus, and vagina (upper two-thirds).	Müllerian ducts.
Lower third of vagina.	Upper part of urinogenital sinus and lower ends of Wolffian ducts.
Hymen.	An organ of the urinogenital sinus and derived from the Wolffian ducts.
Vestibule.	Lower part of urinogenital sinus.
External genitals.	External region on and below pubes (imperfectly worked out).
Bladder.	Anterior division of entodermal cloaca; fundus allantoic.
Urethra.	Upper part from the urinogenital sinus, also lower part but it is retunnelled.
Ureter.	Upward growth from Wolffian duct.
Kidney.	Upward growth, in great part from Wolffian duct, an upper part from Wolffian body.

The next step is to show that the genital tract is not to be looked on as a continuous one unsegmented in its origin, but segmental, and the proof of this is sought in an analysis of deformities that are exact. To use a simile, it is not like a concrete building, continuous and unsegmented, but one built up of separate portions—like a brick edifice. We analyse now, therefore, the exact deformities, the lost bricks, and base on this an understanding of its normal elements or unit characters.

7. THE EXACT DEFORMITIES OF THE FEMALE UROGENITAL TRACT IN RELATION TO ITS TIME DEVELOPMENT.

We may have exact persistent segmental foetal forms in adult life:—

(1) Complete defect of both Müllerian cords, and therefore absence of uterus, tubes, and vagina. (2) Complete absence of anlage of a single Müllerian cord (uterus unicornis verus). (3) Complete separation of both Müllerian cords (uterus didelphys or duplex separatus). (4) Absence of cavity formation in separated and united Müllerian cords, uterus rudimentarius solidus, duplex, bicornis, simplex cum vagina solida. (5) Partial cavity formation in the separate or united Müllerian cords, uterus rudimentarius partim excavatus, duplex, bicornis, simplex cum vagina solida. (6) Uterus bicornis with rudimentary development of a horn. (7) Uterus bicornis septus, subseptus, simplex, vagina septa, subsepta simplex. (8) Uterus introrsum arcuatus septus, subseptus simplex, vagina septa, subsepta, simplex. (9) Uterus planifundalis septus, subseptus simplex, vagina septa, subsepta, simplex. (10) Uterus foras arcuatus, septus, subseptus, simplex, vagina septa, subsepta, simplex. (11) Uterus foetalis. (12) Uterus infantilis et virgineus. (13) Uterus inequalis vel obliquus. (14) Hypoplasia uteri, as in chlorosis and anæmia (von Winckel).

These may be permanent in the adult. To these may be added—

(15) Atresia vaginae; persistence of imperforate hymen in its usual site, or as a transverse septum an inch from the Wolffian hymen. The latter is the persistent eminence of Müller. (16) Persistence of solid cervix in lower third, causing hæmatometra and hæmatosalpinx.

It must also be noted that exact *segments* of the genital tract may be wanting as follows:—

Fallopian Tubes.—Total defect is seen most usually when the genital organs are not represented at all. Single absence is found in the unicornis uterus; the lateral third has been noted as absent where the rest of the tract was normally developed. The middle third may be represented by a connective tissue rudiment. In a case recorded by W. G. Spencer and Alban Doran the tubes alone were unrepresented, while the uterus, ovaries, vagina with hymen, were present. The fimbriated end of the tube was represented by traces in the ovarian pouch (ovarian fossa), and this Doran explains on F. M. Balfour and Keith's view that this part of the tube is related phylogenetically to the pronephros. The round ligaments were present.

We have next to consider cases where, with local losses in the

urogenital tract, there are associated less conditions of a more extensive nature.

In a recent paper by Bolaffio, where he records a case of uterus bicornis with septate vagina, one-half being rudimentary, with defective urethra and defect of the right half of the trigone of the bladder, he classifies 99 cases of *conjoined* defects in the urogenital system as follows:—

TABULAR RESULT OF 99 CASES OF GENITAL AND RENAL ANOMALIES.

Uterus unicornis sine rud. cornu alt	13	Unilateral complete absence of kidney	12
		Rudimentary kidneys	1
		Congenital ectopy of kidneys	0
Uterus duplex separatus cum vagina duplice separata	1	Unilateral complete absence of kidney	0
		Rudimentary kidneys	0
		Congenital ectopy of kidneys	1
Uterus rud. solidus oder partim excavatus	19	Unilateral complete absence of kidney	10 (in 7, also ectopy)
		Rudimentary kidneys	0
		Congenital ectopy of kidneys	16 (in 7, also absence of kidney)
Uterus unicornis cum rud. cornu alt	24	Unilateral complete absence of kidney	19 (twice ectopy of kidney)
		Rudimentary kidneys	1 (ectopic)
		Congenital ectopy of kidneys	8 (twice, also absence and once rudimentary)
Tube defect alone	3	Unilateral complete absence of kidney	3
		Rudimentary kidneys	0
		Congenital kidney dystopy	0
		Lateral complete absence of kidney	25
Uterus bicornis septus and subseptus	32	Rudimentary kidneys	6 (7 times ectopic)
		Congenital kidney dystopy	3 (twice bladder kidneys)
Uterus introrsum arcu- atus and planifund- alis septus, subseptus simplex	6	Unilateral complete kidney absence	3
		Rudimentary kidneys	2
		Congenital kidney dystopy	3 (thrice rudimentary)

In addition to the above disturbances of the sex tube and penultimate gut we may have the *ovaries* abnormal. Both may

be wanting in general absence of the genital organs. It is very rare, if not impossible, to have one ovary alone wanting and the rest of the tract present.

8. THE MALE UROGENITAL SYSTEM: ITS INDIVIDUAL COMPONENTS THAT MAY BE LOST; LOSS OF THE WHOLE SYSTEM IN WHOLE OR IN PART.

Preliminaries as to Development

In the human male the bladder, rectum, and kidney develop as in the female; so also, probably, the heredity cells (sperm cells). The external genitals are special developments from the pubic and subpubic ectoderm and mesoderm and from the cloaca. The scrotum is the equivalent of the labia majora, and the closed urethra is represented by the labia minora and urethra of the female. The testes are normally in the scrotum, *i.e.* have advanced to a complete descent from one represented by the permanent pelvic position of the female. The condition of the neck of the bladder is markedly different from that of the female. In the former the prostatic urethra is a comparatively narrow tube surrounded by the well-developed prostate represented in the female only by Skene's tubules.

In the prostate we have the prostatic utricle, where the vasa deferentia open (mesonephric ducts), the former representing the hymen. Attached to the testes is the hydatid testis, the rudimentary representative of part of the opposite sex-duct element, the fimbriated end of the Fallopian tube. Thus the mesonephric duct is fully represented in the male, while the structures forming the Müllerian ducts of the female are represented only by rudimentary elements (hydatid testis).

The *sex gland* (testis) develops its framework on the genital ridge of the Wolffian body, utilises parts of the ducts for its tubular portion, taking the Wolffian duct proper for its *vas deferens*. The sperm cells probably originate from an early division of the male zygote and travel to the genital ridge of the Wolffian body, but all this has not yet had so full and demonstrative investigation as it has obtained in the analogous process in the female (see p. 14). It is quite possible that in the early progress of the heredity cells along the germinal path in the germ layers we are unable to distinguish male from female heredity cells.

THE INDIVIDUAL GROSS COMPONENTS OF THE MALE UROGENITAL TRACT THAT MAY BE LOST; LOSS OF THE UROGENITAL SYSTEM IN WHOLE OR IN PART.

The exact defects of the male urogenital tract have not been worked out so fully as in the case of the female. This may be due to the greater simplicity of the tract and to a relative infrequency of malformations.

The male urogenital system may be completely lacking on one side, and this has been described by Professor van den Broek of Utrecht in an interesting paper, "*Ein Fall von vollkommener Agenesie des rechten Urogenital Apparates*," giving also a series of cases where there were full or partial defects. In his special case the aorta, vena cava inferior, and the viscera were normal. There was no special right renal artery or vein, and the right kidney was entirely absent without any rudiment even in the connective tissue where the kidney normally lies. The ureter was wanting.

The left kidney was abnormally large (15 cm. \times 8 cm. \times 4 cm.) The pelvis was single as well as the ureter, and the latter opened normally into the bladder. There was no trigone, but a marked ridge ran between the ureteric opening and the colliculus seminalis. There was no vas deferens or vesicula seminalis on the right side, and the right side of the prostate was so small that the whole gland was asymmetrical in shape. The suprarenal was not in its position, but by tracing the sympathetic it was found in the pelvis to the mesial side of the psoas muscle and somewhat beneath it.

As to the external genitals, the scrotum was small and contained only one testis, in the middle line behind the phallus. There was also a pigmented mesial scrotal streak. Other cases are given, and the results tabulated as follows:—

1. In lateral absence of the kidney we may have total want of the corresponding urogenital tract, apart from the phallus.

2. Testis present; epididymis, vas deferens, vesicula seminalis, ureter, and kidney absent.

3. Testis present; epididymis partially present or defective; vas deferens, vesicula seminalis, ureter, and kidney wanting.

4. Testis, epididymis, and vas deferens present; vesicula seminalis, ureter, and kidney wanting.

5. Ureter and kidney alone wanting.

6. Ureter ending blindly above; kidney wanting or rudimentary.

7. Congenital cystic kidney. Here there is probably a want

of union between the part of the kidney developing from the Wolffian duct and that laid down higher up.

In regard to the descent of the testes, we may have the gubernaculum awanting, and a small non-descended testis as in the free-martin in cattle; or the presence in the human male of the testes in the abdomen and pelvis, non-descent of the testis. I have already discussed this question in another paper.

The male urogenital system is thus segmental—viz., made up of kidney, ureter, epididymis, vas deferens, vesiculae seminales, gubernaculum testis on each side, and these segments may be awanting, on one side usually, either individually or as a whole.

The non-potent or opposite sex-duct elements are also segmented, and thus in man all these segments are lost and degenerated, except the hydatid testis and the prostatic utricle.

We see, therefore, that the male and female genital tracts, potent and non-potent, are made up of exact segments, and that these segments are also grouped in larger units. Both may be regarded as unit characters or grouped unit characters in a Mendelian sense.

CONTRAST BETWEEN MALE AND FEMALE SEX ORGANS.

The human male and female urogenital tracts are so constructed, or have so evolved, that each contains in its special sex and sex-duct portion, potent and non-potent organs, the latter in each case being segmentally defective and degenerated relics of the genital ducts of the opposite sex.

The most pronounced differences between the sexes are: (1) The pelvic position of the ovaries, the testes being extra-abdominal and in the scrotum. (2) The fully-developed and permanent round ligaments and ovarian ligaments represented in the male foetus in the earlier months by the transient stages of the gubernaculum and testicular caudal ligament. (3) A split condition of the labia majora and minora comparable with the early stages in the male leading up to the formation of the scrotum, the closure of the spongiosum, and the formation of the urethra. We have, however, exact losses in the female as compared with the male. (4) A loss of the middle segments of the Wolffian duct and of the greater part of the Wolffian body, but retention of a part of it as epoöphoron and paroöphoron as well as of the lower ends of the Wolffian ducts to form the hymen. The corpus spongiosum is almost entirely awanting, the

cc. cavernosa partly in the female, and mainly in an aplasic state.

It is evident that the urogenital system is based on the Wolffian bodies and ducts. In the male the mesonephric duct is the main one; in the female a similar excretory duct—the potent tract—probably the pronephric. It is from or in connection with the Wolffian bodies and ducts and from the primitive gut that the urogenital organs arise, and thus any growth-disturbance or aplasia of the former leads to serious changes in the latter.

The human male and female may be looked on as “varieties” of homo, the variation being in the sex organs for the purpose of sexual reproduction. With this is linked a condition of internal secretory glands which lead to secondary changes in the mental attitude to the world and in actual bodily condition—in pelvis, subcutaneous tissues, and in the epidermis and its derivatives—skin, mammae, mesial incisor teeth. The mental attitude in the female is passivity or a forced activity; in the male natural activity. The one seeks, the other is sought. The female intellect is more intuitive and subtle; the male more balanced and restrained. In the female the emotions lead; in the male they are much more under control.

The argument thus has been that the sex-duct organs are segmented, each with degenerated representatives of the opposite sex. We must now therefore trace more deeply how these sexual differences have arisen, and begin by discussing

9. THE SIGNIFICANCE OF MENDEL'S WORK.

Mendel showed by his famous plant crossings that (1) the “soma” of a plant or animal is to be regarded as made up of autonomous parts—that is, of structures which interchange in themselves during succeeding generations but do not blend. These are termed unit characters; (2) when crossings are made in plants or animals with one or more contrasted and thus recognisable unit characters—tallness and dwarfness in peas, for instance—on each side, the ultimate result is that these contrasted qualities are noted to sift out in a probability ratio of 1:2:1 when there is one contrasted character on each side, of 9:3:3:1 when there are two on each side, and so on; (3) in a crossing with one contrasted unit character on each, one of these is alone represented in the soma of the plants of the first generation (F_1), but afterwards both qualities come out in a probability

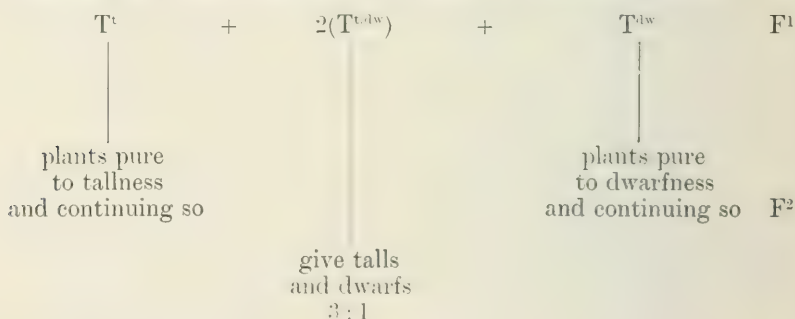
ratio in the plants (*i.e.* in the soma), with no preference for one quality, *quâ* the soma, as in F^1 . On this preference for one quality in the soma of F^1 a theory of dominance and recession or strength and weakness was formulated by Mendel and has been pushed by many observers, especially among English Mendelians. It would take too long to discuss the whole question, but the correct reading of a Tall \times Dwarf crossing is as follows:—

If T and D represent the tall and dwarf plant soma and t and dw the causes or determinants of the tallness and dwarfness as expressed in the determinants of the pollen grains and egg cells, the scheme is as follows:—

$$\begin{array}{cc} T^t \times D^{dw} & P \\ T & F^1 \end{array}$$

i.e. plants all somatically tall.

In the pollen grain and egg-cells, however, the selected qualities are distributed in a probability ratio as follows:—



The talls from T^t continue to breed true to tallness, while $2(T^{t,dw})$ gives in F^2 $\frac{1}{3}$ of pure talls, the others, so-called impure talls, again giving T to D 3:1. From T^{dw} pure dwarfs continue to come in subsequent generations. When the generations F^1 – F^n are summed up as to plant results, we get a ratio of pure talls to impure talls 1:2:1, a probability ratio. There is only purity of gametes to a contrasted quality in those breeding pure to a quality. In the impure talls two-thirds have both qualities in the gametes.

The 1:2:1 ratio is not due, therefore, to a *probability combination* of pollen grains and egg cells, or gametes as they have been termed, but to a *probability distribution* of their contained determinants in the oöspore, *i.e.* in the part of the oöspore from which the pollen grains and egg cells arise, the other part having only the somatic determinants in it.

Dominance and recession mean merely that in F^1 one contrasted quality appears in the *soma*, but both qualities are distributed causally and in a 1:2:1 ratio in the pollen grain and egg cells, and these when interfertilised give the 1:2:1 ratio in the somata of F^2 . The result of the 1:2:1 ratio is that each of the qualities is placed pure for $\frac{1}{4}$ of the plants, while $\frac{1}{2}$ give the 3:1 ratio* as already explained, and thus a pure strain for each contrasted character established. In one half the contrasted qualities are placed together in the pollen grains and egg cells or in the gametes, and the ratios given out as 3:1. This partial and fractional purity result is of the highest importance.

It is not enough to consider Mendel's unit characters as they are in the adult soma; we must go on to connect Mendel's results with Weismann's views, and I therefore now take up the question of

10. HOW ARE WE TO REGARD WEISMANN'S DETERMINANTS?

We may look on Weismann's determinants in the heredity cells as electrons of protoplasm, as hormones, with a part for the actual basis of the organs to which they are causally related, and we may speak of them as the causal determinants, or in brief as the determinants. On the view about to be laid down they may be considered as neutral molecules, and when under some stimulus causing loss and gain of electrons, as positive and negative ions, each becoming one or the other as the stimulus acts or ceases to act. The positive and negative ions are to be considered as acting under the convention that like ions repel, and unlike attract. It is in the molecular whirl of the determinants that atoms of protoplasm (electrons) with or without their basic substance, are thrown off—maturation at fertilisation—and we thus have the three possibilities of charged determinants, neutral molecules, or negative and positive ions. The most exaggerated whirl and extrusion of electrons, etc., is seen in radium, but we must regard living protoplasm as having this instability in a marked degree.

One argues here from the actual organs in the body of man back to their causal agencies in the germ plasma, just as Dalton, in his celebrated atomic theory, reasoned from exact chemical interchanges of substances back to the atoms.

* The 3:1 ration is due to the fact that the pure tall and those that give rise to some dwarfs and tall are the same somatically, and thus $\frac{1:2:1}{3:1}$ is the combination result.

I now go on to apply the theory that the human genital tract is segmental in its nature, and that these segments are Mendel's unit characters; that they are causally represented in the heredity cells and their derivatives by Weismann's determinants. In the allotment of these determinants at fertilisation, I regard the determinants as distributed in the heredity cells of the p.g.c. mass in a probability ratio, while at maturation prior to fertilisation there is a loss of determinants in the ejection of the polar bodies and that in this way each one, or group, of any of the determinants may serially be cast off, causing discontinuous variation. In mitosis we have, as we shall see (section 14 *et seq.*), electrolysis and distribution of ions of protoplasm to the positive and negative parts of the cell (anions and kations), bringing about continuous variation. Finally, it is from polar losses that we ultimately get a probability ratio between the potent and non-potent tracts. At present embryologists are neglecting the molecular physics of mitotic and maturation changes prior to and at fertilisation, but must range themselves up with chemists and physicists in applying modern views to this stage of development. The molecular physics are specially considered under section 14, but we must first take up—

11. RECOGNITION OF THE UNIT CHARACTERS OF THE GENITAL TRACT FROM PREVIOUS ANALYSIS OF EXACT DEFORMITIES OF HUMAN UROGENITAL TRACT.

From the exact losses in the male and female urogenital tract known as deformities, and from those producing the opposite sex-duct element in each sex, we may regard both tracts as made up of certain segmental elements or unit characters of Mendel.

UNIT CHARACTERS OF THE POTENT FEMALE URINOGENITAL TRACT.—These require in the present state of our knowledge to be taken up in relation to the fully-formed organs. They might be selected, but not so easily, from the primitive basal organs, Wolffian bodies and ducts, Müllerian ducts, urogenital sinus, cloacal membrane, and primitive gut; but as the former are better investigated, and are likely to continue to be so in the future, they will be considered here, the basal structures, however, always being kept in mind.

These *unit characters* may therefore be considered as the following:—

PLATE III.

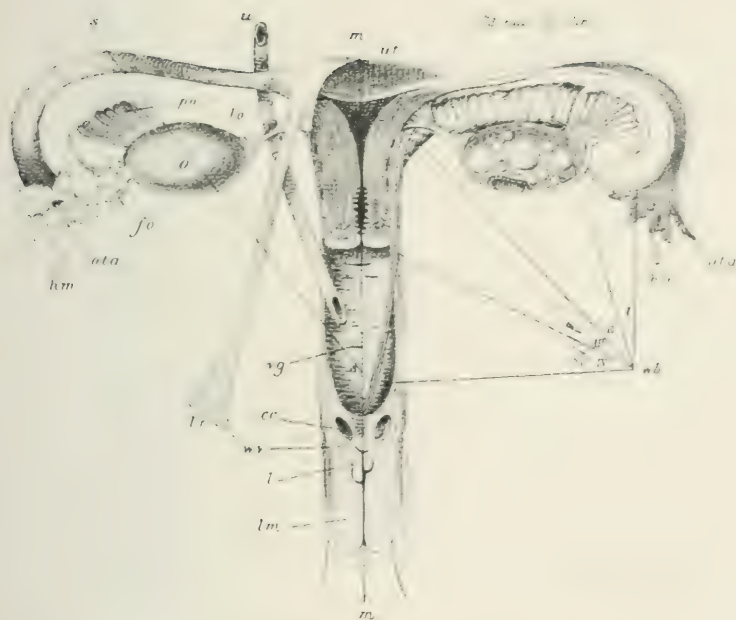


FIG. 1.—Female typical sexensemble shown on Coelen's diagram (v. 1, p. 100). Ovary (o), tubes (t), uteri (u), vagina (v), external genitalia (vul), non-potent accessory sexual elements (cl, l, to IV.), Epithelium (e), and para-epithelium (II. and III), Gartner's canal (II. to IV.), round ligament (lr), ureter (u). The secondary sexual characters not shown, but see figs. 17 and 18. The potent duct elements are at a maximum of segments, the non-potent at a minimum, and the secondary characteristics congruent to the sex.

Potent—

Ovaries	2
Mammæ	2
Fallopian tubes	6
Uterus (body and cervix)	4
Vagina (upper two-thirds)	2
Vagina (from urogenital slings)	1
Hymen	2
Vestibule	1
Larynx	1
Suprarenals	4
Round ligaments	2
Ovarian ligaments	2
Broad ligaments	2
Glans clitoridis	2
Prepuce	1
C. cavernosa	2
Absorbing factors as to septa in uterus	1
" " cervix	1
" " vagina	1
" " hymen	1

40

Non-Potent or Opposite Sex Elements.—Epoöphoron and duct. 4.

The ratio is thus 40:4.

THE SEGMENTED MALE UROGENITAL TRACT.

Potent—

Testes	2
Epididymis	2
Vasa deferentia	6
Vesiculae seminales	4
Prepuce	2
C. spongiosum	1
C. cavernosa	2
Gubernacula	2
Suprarenals	4
Larynx	1
Absorbing factors in scrotum	1

27

Non-Potent—

Hydatid testis	2
Prostatic utricle	2
Mammæ	2

6

We thus get the ratio as 27 to 6 approximately.

The female urogenital tract may be thus considered as having a 40:4 ratio, the male as 27:6 unit characters in their typical *sex-ensemble*. These numbers are only approximate, and will require modification as our knowledge of this subject increases.

12. THE TYPICAL SEX-ENSEMBLE A PROBABILITY RESULT IN BOTH SEXES.

This probability ratio is well displayed in Coblentz's diagram of the female organs, and in Waldeyer's of the male organs (Plates III. and IV.).

It must now be noted that the characteristic and opposite sex-duct elements in each are inverse as to the extent of their development, the opposite sex-duct elements being at a certain minimum, while the normal sex-ducts are at a maximum. This may be looked on as a probability phenomenon as in the results of coin tossings. If the heads in ten coins are considered in a mere biometric analogy, as representing the segmented male typical ensemble, the tails in ten coins the female segmented typical ensemble, then, as in a certain number of 10 coin tossings we get 9 head and one tail or 9 tail and one head, so I now go on to show that the result in the typically developed sex-ensemble is a probability one, that there is a maximum of the duct-segments characteristic of the sex, a minimum of those of the opposite sex-duct element, and a sex-congruence in the secondary traits.

There must be a *minimum* of the opposite sex-duct elements in the human species, otherwise the characteristic elements would be diminished in number as in a 6—4 coin tossing. This disturbed ratio is what gives rise to so-called pseudo-hermaphroditism, as I hope to show in a separate communication. The position of the question is now this. If the unit characters of the genital tract are represented by Weismann's determinants in the heredity cells and their immediate derivative the zygote, and if in the genital tract the potent and non-potent segments have a probability relation, the *locus* of this probability process must be settled, and this is now to be considered.

13. THE PROBABILITY RESULT AS TAKING PLACE AT THE P. G. C. MASS FORMATION AND AT MATURATION BY MEANS OF REARRANGEMENT AND LOSSES OF THE DETERMINANTS.

To understand this statement, viz. that the normal urogenital mammalian tract may be regarded as a probability result, we must now consider the following points.

The unit characters of the urogenital tract (segmented condition)

PLATE IV.

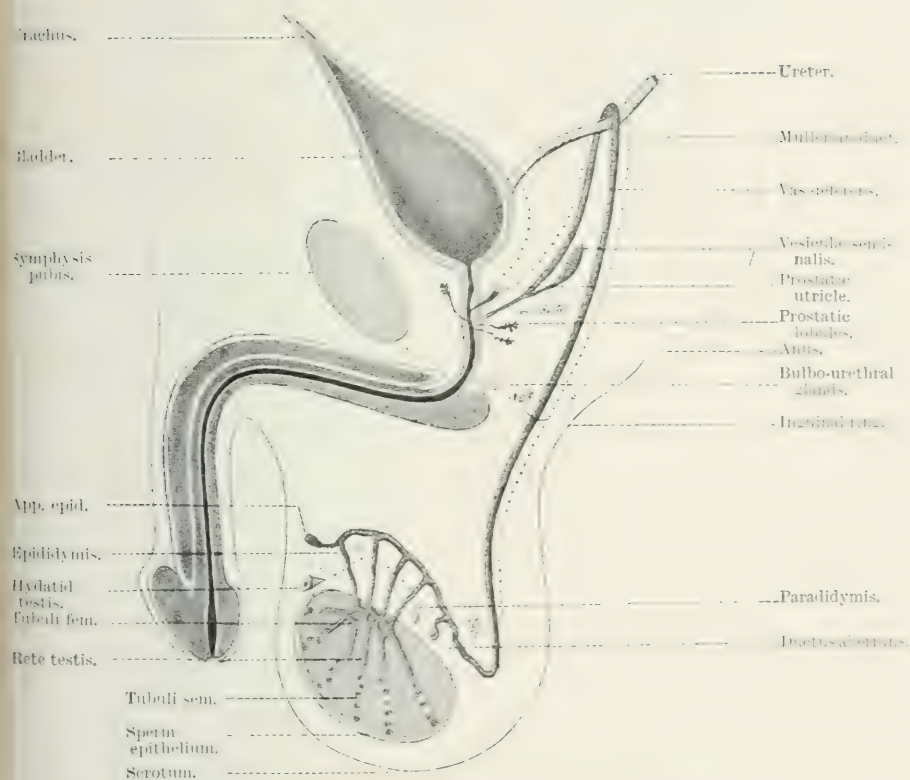


FIG. 1.—Typical male sex-ensemble (Waldeyer). *Potent*—Testis, descended; vas deferens, phallus. *Non-potent or opposite sex duct elements*—Müllerian in dotted line, prostatic utricle. Thus a maximum of potent duct elements and a minimum of opposite sex duct elements.

must be regarded in the light of Weismann's causal view already given. The locus of the probability mechanism must be assigned, and the nature of this "tossing" or probability mechanism must be explained.

On Weismann's theory we must regard the Mendelian unit characters of the adult as represented by determinants in the zygote. As the adult results in the form of unit characters are varied in a probability mechanism and some may be not represented, we naturally ask, Where does this variation and loss take place? What is the *locus* of the change?

The locus of the probability is in the heredity cells and zygotes. In Mendelian crossings with one contrasted character on each side, as, for instance, in the $T \times D$ pea plant crossing, it is usually held that the probability result of the segregation of the contrasted unit characters is due to an elementary probability combination of the pollen grains and egg cells. *E.g.* if a is to be considered as representing the tall character and b the dwarf in a $T \times D$ crossing, then $(a+b)^2$ gives $a^2+2ab+b^2$, the probability ratio 1:2:1, in which the plants with contrasted unit characters segregate *quâ* the latter. This is an exceedingly serious error. The probability result is worked out in *the determinants of the zygote and derived pollen grains and egg cells*. Were it the result of a probability combination of egg cells and pollen grains as such, then, as the action of these is confined to a generation, the probability ratio in the plants (1:2:1) should come out in F^1 . This does not happen, as in F^1 the *soma* of the plant expresses only one contrasted character in this crossing, the tall unit character (*vide* p. 29). What happens really in F^1 is that the determinants for tallness and dwarfness are distributed in a probability ratio (1:2:1) in the pollen grains and egg cells, while the part of the zygote (oöspore) giving rise to the *soma* of the plant has, *inter alia*, only one contrasted unit character in it (tallness).

The great point is that *we must regard the zygote as the clearing-house for variation allotment of the determinants, the subsequent establishment of related unit characters being the result*. Putting it broadly, relative to the cause of variation, and so far as intrinsic causation at fertilisation and in the zygote are concerned, we may regard the matter thus. When the zygote is formed there is early set aside a part for the soma of the plant or animal, and a part, the primitive germ-cell mass, for the future heredity cells (primitive germ and sperm cells). A distribution of qualities takes place, and in the primitive germ-cell mass, at any rate, this follows the law of probability. The results of all adult measure-

ments of "organs" give frequency polygons as a sequence to this.

If a large amount of any determinant is in any special case distributed to the soma there will be less for the primitive germ-cell mass, and this is seen in the progeny of this special soma not equalling it in result. There is thus in heredity not only a transmission but a distribution. In this distribution ordinary continuous variation arises.

In the discontinuous variation (Bateson)—mutation of de Vries—we have a different mechanism, due to losses in the polar bodies, as we shall see. Continuous variation is really an intrinsic property of the germ plasma but cannot be bred for, and variations due to it do not accumulate. The mutation is the striking variation, and its results are transmitted, inasmuch as it is a germ plasma loss.

14. MOLECULAR PHYSICS DURING THE FORMATION OF THE PRIMITIVE GERM-CELL MASS AND IN MITOSIS AND MATURATION.

I have attempted to show that the female and male urino-genital tracts, potent and non-potent, are segmental in their nature, that these segments may be assigned from a consideration of the exact deformities of these tracts, and that they may be regarded as unit characters in a Mendelian sense.

I have further urged that the determinants of Weismann in the heredity cells and zygote are causal to them, and that we may regard the distribution of these determinants in the p. g. c. mass and during mitosis and maturation as happening in them. I must, therefore, re-state the phenomena above mentioned, and then consider, so far as is possible, the molecular physics of the determinants during their active intrinsic changes.

One does not need now to discuss the tremendous influence Dalton's atomic theory had, and still has, on the progress of chemistry and physics. Its more recent expansion by modern observers has given it still greater precision, and to this the researches of physicists on the nature of matter and of electricity, and the effects of electrical discharges in Crookes' tubes and through gases, have, along with radium investigations, largely contributed. The modern chemist and physicist investigate in terms of electrons (Johnstone Stoney), corpuscles (Sir J. J. Thomson), ions (Faraday), and we can now form a clear conception of what happens in an electrical current and in electrolysis of gases and fluids. This line of research and theory has made

little impression in pure cytology and embryology, and therefore in this section I wish to make a beginning in what will prove, I have no doubt, a fruitful line of inquiry.

The first great step in biology was made by Weismann when he suggested the fertile idea that we must consider the zygote as containing determinants for the adult organs and the progeny of their possessor. This has been much criticised, especially as it has shaken most seriously the doctrine of natural selection and its necessary sequences, above all, the theory of the transmission of somatic acquired characteristics. I am convinced, however, that time will vindicate the value of Weismann's conception.

As will be seen presently, I look on Weismann's determinants as molecules and ions, the former of which may be neutral when quiescent, the latter positive or negative during mitosis and maturation, and that these two processes are concerned in the production of continuous and discontinuous variation (de Vries' mutation in the latter process).

Thus the phases of mitotic division of a somatic cell and those in maturation or in early zygotes, setting aside of the p. g. c. mass, have a complete likeness, at certain stages of the former, to the magnetic field of the electrician, well seen in the arrangement of iron filings on a conducting plate between the poles of a battery; and in the case of maturation to the ejection of electrons when an electrical current is passed through a gas. When one, however, tries to apply the former analogy in mitosis, exact explanation fails on the ordinary view of the magnetic field expressed in text-books of physics.

The explanations given by Faraday and Clausius of the electrolysis of solutions of salts such as chloride of sodium or sulphate of copper, and the further work by Sir J. J. Thomson, Larmor, and others on the ionisation of gases, as well as the clearer views on the nature of electricity now held, give us, however, a more exact comprehension of mitotic changes, whether in somatic heredity, or early zygotic cells, and it is the application of these advances that I now go on to take up.

(To be continued.)

ANAPHYLAXIS AND STATUS LYMPHATICUS: THEIR RELATION TO INTENSIFIED TYPES OF DISEASE IN INFANCY AND CHILDHOOD.

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I.

IN two preceding papers published in this *Journal* (^{1, 2}) a description was given of abnormal types of two very common bacterial infections—pneumonia and tuberculosis. In each case the illnesses occurred in childhood, and in a few in infancy. In all the deviation from the standard type was in the same direction—in that of greater sharpness and intensity of the clinical reactions. The phrase *hypersensitiveness* was used to describe these examples of intensified pneumonia and intensified tuberculosis. In both these diseases, the one acute and the other chronic, post-mortem examination was made in a number of cases, and in addition to pneumonia and tuberculosis, showed clear evidence of the abnormal condition of body termed "status lymphaticus."

In the present paper I propose to discuss these two groups of illness further, and especially in connection with the following propositions:—

Firstly, that these abnormal types of illness, which in the meantime may be labelled "fulminant," are clinical illustrations of the pathological condition, anaphylaxis.

Secondly, that the morbid condition of body, status lymphaticus, which was present, is more than detached coincidence, but is essentially connected with the distorted and intensified type of illness.

Thirdly, that other fulminant types of illness in young people may be anaphylactic, and also explained by abnormal constitution.

ANAPHYLAXIS.

It will perhaps make the subsequent argument clearer if, at the outset, a brief statement is made of our present knowledge of anaphylaxis. Anaphylaxis may be described broadly as that condition of body in which abnormal reactions follow the repeated injection (hypodermic, intra-peritoneal, or intravenous) of a substance which, at the first injection, produced no apparent disturbance of health, the amounts used both at the first and at the repeated injections being often, in each case, very small. The

list of substances used in this way that may produce anaphylaxis is large, but is confined to the proteins. While partially-digested protein, in the form of peptone, will produce this reaction, the end-products or amino acids are said not to do so.

General Anaphylaxis.—As to the reactions produced, they appear suddenly, are violent, and may produce death in a few minutes (anaphylactic shock). If the animals recover, they do so quickly and completely. The symptoms and disturbances vary in different animals, but may be generally stated as spasmodic contraction of non-striated muscle (stomach, bowels, bronchi, uterus, pilomotor muscles); sudden and profound fall of blood-pressure, with vascular dilatation, capillary hemorrhages, evidence of intense irritability followed by depression of the central nervous system seen in convulsions, paralysis, loss of consciousness.

It is not necessary for the purpose of our argument to go into the very difficult problem of the mechanism of anaphylaxis; it is usually discussed in the terms of immunity, and in relation to it. It must differ considerably in different animals: for example, in the dog and in the guinea-pig. And though the general character of the changes is the same for animals of one species, *there is considerable range in the degree of those changes in different individuals of the same species.*

Though the term anaphylaxis was introduced by Richet using congestin, a poison prepared from the tentacles of certain actiniae, most of our knowledge of the condition has been based on the use of horse serum in guinea-pigs, rabbits, and dogs. Among laboratory animals it has not been possible to induce anaphylaxis in the rat. The word *anaphylaxis* would seem to be unfortunate. It expresses something "opposed to immunity"; and yet there is much evidence that the reactions in anaphylaxis are due to excessive activity of the processes of immunity. The term *hypersensitiveness* is more accurate and cautious: it implies no theory, but merely describes the objective phenomena. And, indeed, in the literature of anaphylaxis, the word *hypersensitiveness* is often used synonymously with it.

The experimental phenomena of horse-serum anaphylaxis are specially important, because they throw light on the clinical phenomena produced by the hypodermic injection of horse serum in man in the various antitoxic sera.

Local Anaphylaxis.—In the above cases anaphylaxis reveals itself in certain general body-reactions, *e.g.*, fever, general effects on vascular and muscular tissues, etc. But occasionally the changes are more localised. We have what may be called a local, as well as a general, anaphylaxis. Arthus¹ described in rabbits a local sloughing of tissues at the site of repeated hypodermic injections of horse serum. This is known as the Arthus phenomenon, and is to be contrasted with

the general anaphylactic reaction seen in its extreme form in the guinea-pig, and known as the Theobald Smith phenomenon. But we have an even earlier example of local experimental anaphylaxis in the work of Koch in 1890. He showed that a single injection of living tubercle bacilli under the skin of a guinea-pig produced an ulcer, then an infected gland, and finally a generalised tuberculosis; but that a repeated injection produced a much more violent local reaction ending in necrosis, with an absence of the generalised infection.

In both these forms of anaphylaxis, general and local, the leading characteristic may be described as a violent intense reaction to repeated injection of horse serum, in so small a dose that the first injection produced no apparent reaction at all.

The object of this paper is to show that both the general and the local anaphylactic reactions are pure experimental types of biological phenomena which have their analogues in clinical medicine; and that striking examples of these analogues are to be found respectively in the cases of fulminant pneumonia and in the special forms of tuberculosis known as scrofula, described in previous papers (¹, ²). Both in the experimental and in the clinical types hypersensitiveness characterises the reaction; but in the course of this paper I hope to show that there are other and more essential resemblances.

Clinical Examples of General Anaphylaxis.—A number of clinical types of anaphylaxis have been established; and they also will be found to fall into the same broad divisions of general and local forms.

Serum Disease.—Of the general forms, the serum reactions following the hypodermic injection of antitoxic horse sera in diphtheria, tetanus, etc., may be taken first. They seem exactly to reproduce the conditions of the animal experiments with the same substance. The investigations of von Pirquet and Schick³ and of E. W. Goodall⁴ have collected a large and accurate body of data on this subject of "serum disease." The reactions include fever, various types of rash, oedema, arthritis, etc., and appear after a latent or incubation period of one or two weeks. They occur much more frequently, and as a rule much more severely, in second attacks of diphtheria, where a second injection of serum has thus been given. This latter group is specially important, because in them the human experiment seems an exact replica of the animal experiments. In this group the reactions are not uniform, either in their severity or in the duration of their incubation periods. The variations are divided into three classes—the *ordinary* or normal reaction, appearing in from 8 to 16 days; the *accelerated*

reaction, appearing (and usually in exacerbated form) in from 1 to 6 days; and the *immediate* reaction, with intense phenomena, developing in a few hours or even in a few minutes, and in a few cases terminating in death. In some of these fatal cases of "immediate anaphylactic reaction" the post-mortem appearances of status lymphaticus have been found. It is not known what determines the wide variation in the severity of reaction in these cases of repeated injections of antitoxic horse serum, but it is very important to remember the fact that *great variation in the degree of reaction occurs*. This fact has been a little neglected in discussions of the anaphylaxis of "serum disease," but it is clear that there are many degrees of intensity, from the ordinary anaphylactic reaction to the intense "immediate" reaction. If the one is called hypersensitiveness, it would be strictly accurate to call the other super-hypersensitiveness.

Food Anaphylaxis.—The violent urticarias and oedemas following the use of certain kinds of food by certain individuals form another established group of cases of food anaphylaxis. The unique feature of the cases of this group is that the protein substance causing anaphylaxis is swallowed in the ordinary way. The previous examples of anaphylaxis have all been produced by the *parenteral* introduction of protein. Food anaphylaxis is apparently produced by the passage of undigested protein through the alimentary mucous membranes. These cases are further interesting in that there is no apparent evidence of previous sensitisation in many of them.

Pollen Asthma.—Attacks of hay-fever and of asthma, produced by the pollen of certain plants and grasses and by various animal emanations, form another well-defined group of clinical examples of anaphylaxis.

Acute Infectious Diseases.—With regard to the incubation period and the symptoms of invasion of the acute infectious diseases, there is a division of opinion. There seems to be present something similar to the conditions of an anaphylactic experiment. There is the primary inoculation of foreign bacterial protein; there is a latent period during which the amount of foreign protein is increasing; there is, finally, the sudden appearances of disturbances, fever, vomiting, exanthems, etc. Von Pirquet and Schick, Vaughan,⁶ and others regard the symptoms of onset of the acute fevers as anaphylactic. Goodall refuses to admit this. For the main propositions of this communication, given at the outset of the paper, the determination of this question is a crucial one. If

these propositions are true, they can be harmonised with the views of von Pirquet. The cases of fulminant pneumonia in infants and older children, described in a previous paper,¹ can be interpreted in the light of anaphylactic phenomena. If the symptoms of onset of an ordinary case of pneumonia represent normal anaphylaxis, those of fulminant and acutely fatal pneumonia may represent intense exaggerated anaphylaxis. And an exact analogy seems to be found in the contrast (and the resemblances) between the normal reaction of "serum disease" in one patient and the immediate reaction in another. *Both in the ordinary and in the fulminant pneumonia the symptoms of onset are anaphylactic; they differ in intensity, but they agree in their essential biological character.*

Clinical Examples of Local Anaphylaxis.—The best known are the cutaneous and conjunctival tuberculin reactions. There are also the mallein and luetin cutaneous reactions in glanders and syphilis, and Twort's reaction in Johnes' disease of cattle, an enteritis produced by acid-fast bacilli somewhat resembling tubercle bacilli in their form. Of these various examples, the one that is relevant to this discussion is the cutaneous tuberculin reaction. This reaction differs in intensity in different individuals, and its intensity may be increased to an extreme point in certain forms of tuberculous infection. It was shown in a previous paper² that scrofulous types of tuberculosis showed this intensified tuberculin reaction. I would submit that *in the local reactions in scrofula we have an exaggerated form of local anaphylaxis, just as in fulminant pneumonia we have an exaggerated general anaphylactic reaction.*

Pathological Resemblances.—I think it can be shown that these alleged instances of clinical anaphylaxis, namely, fulminant pneumonia and intensified local tuberculosis (or scrofula), show pathological character similar to those in accepted instances of anaphylaxis. The leading pathological features of anaphylaxis may be given as vasomotor paresis (vascular congestion); constriction of certain types of non-striped muscle; oedema of the loose connective tissues, both subcutaneous and internal; destruction of the more delicate body epithelia; the production of these changes by very small doses of virus.

Vasomotor Paresis.—Vascular congestion of many tissues and organs is emphasised in all histological investigations on anaphylaxis. It was so prominent in Richet's experiments on dogs that he called the substance by which it was produced *congestin*.⁷ It is beautifully demonstrated in Scott's plates and photographs

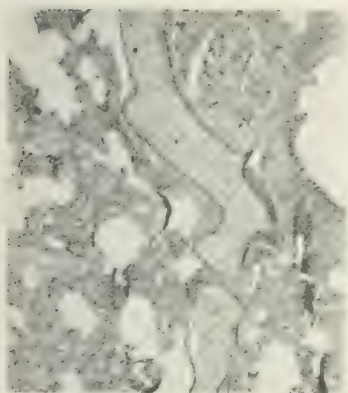


FIG. 1.—Section of lung of T. H., aet. 11 years. Fulminant institutional pneumonia. Shows extreme dilatation of smaller blood-vessels.

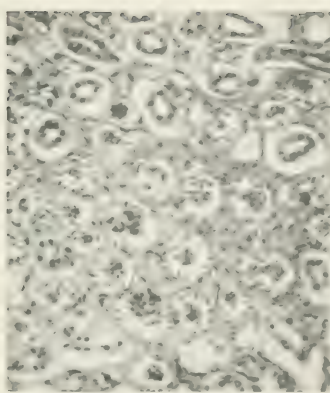


FIG. 2.—Section of medulla of kidney from J. W., aet. 11 years. Institutional pneumonia. Dilatation of blood-vessels. The parts are filled with exudate, partly in dilated blood-vessels, but chiefly in the collecting renal tubules.

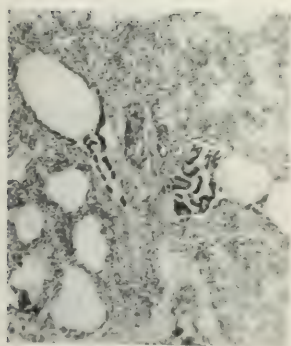


FIG. 3.—Lung, L. P. Infant, aet. 9 weeks. Found dead. Fulminant broncho-pneumonia. Note in upper left quadrant dilated infundibulum and strongly contracted proximal portion of bronchiole, and to right of this cross-section of bronchiole with convoluted epithelium, suggesting constriction of bronchial muscle.

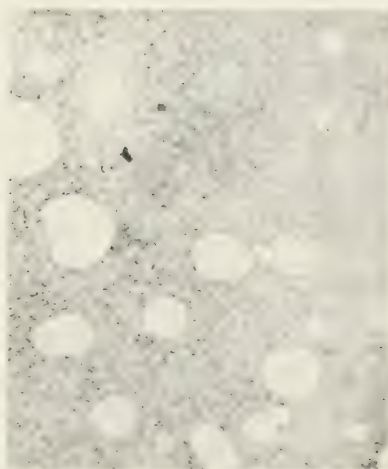


FIG. 4.—Section of lung from F. B., aet. 12 years. Fulminant institutional pneumonia. Note the empty, and in some cases dilated, alveoli, widely separated by oedematous and cellular exudate.

It is shown also in the general cyanosis of cases of "immediate" reaction in serum disease.

This vascular congestion was marked in the cases of fulminant pneumonia described in the previous paper and alluded to in this. It was demonstrable both in life and after death—in the cyanosis of the skin noted in the cases of institutional pneumonia, both in the fatal and non-fatal cases; and in the various organs and tissues after death, both in the infantile cases of fulminant pneumonia, and in the group of institutional pneumonias. This congestion was naturally most marked in the lungs, but it was an outstanding feature in sections of the kidney, thymus, liver. It is illustrated in Figs. 1 and 2, which show the great dilatation of the smaller blood-vessels of the lung and of the vessels of the renal medulla.

Constriction of Non-striped Muscle.—This has been demonstrated in the heart muscle of the anaphylactic rabbit (Arthur⁸), and also in the stomach and intestine, uterine and bronchial muscles of the guinea-pig (Auer,²⁰ Dale,²¹ Schultze and Jordan²²). This constriction of the bronchial muscle in the guinea-pig is remarkable in that it is the actual cause of death by suffocation, owing to the loose and redundant character of the mucous lining. Contraction of plain muscle is absent from the anaphylactic reactions in the dog; but in man constriction of bronchial plain muscle is evident in the anaphylactic forms of asthma. It has even been suggested that the uterine contractions in menstruation and parturition are anaphylactic phenomena.

Fig. 3 shows a section of the lung from an infant of nine weeks, found dead in bed, the post-mortem examination showing bronchitis and commencing broncho-pneumonia along with thymo-lymphatic hyperplasia (status lymphaticus). In the figure a bronchiole is shown in longitudinal section, its terminal infundibular portion dilated, while the proximal part is closely constricted. The convoluted character of the adjacent bronchiole in cross-section also suggests constriction of its bronchial muscle.

Edema.—Edema, especially subcutaneous and cutaneous, is one of the prominent features of anaphylaxis, both in laboratory animals and in man in serum disease. Scott⁸ has demonstrated this also in deeper structures, and especially in the interalveolar tissue of the lung in the anaphylactic guinea-pig.

Figs. 3 and 4 show this interalveolar pulmonary edema both in fulminant pneumonias of infants, usually described as cases of status lymphaticus, and in the group of institutional pneumonias in older boys. In the latter it was often extreme, the empty and

often distended alveoli being widely separated by very extensive interstitial oedema (see Fig. 4).

Epitheliolysis.—Auer and Lewis² describe "extreme endotheliolysis and hamorrhage" in guinea-pigs dying 4 to 6 hours after the reacting dose (subcutaneous) of horse serum.

A similar rapid extensive destruction of epithelia is seen in the lungs of the cases of fulminant pneumonia. In Fig. 5, where the duration of illness was 6 hours, the bronchial lumen is filled with desquamated epithelium. In Fig. 3, the case of an infant found dead in bed, denudation of epithelium is already taking place in the bronchi. Fig. 6, showing a rapid ulcerative lesion produced at the site of the von Pirquet cutaneous reaction in a case of scrofuloderma, is another illustration of the same rapid intense necrosis of epithelial cells. Further, one of the clinical features of cases of scrofula is the tendency to widespread and obstinate catarrhs of mucous membranes and skin, evidenced in the seborrhœa and eczema, the chronic conjunctivitis and rhinitis, bronchitis, and diarrhœa of this constitutional condition.

Weakness of Virus.—One of the most astonishing things about experimental anaphylaxis is the violent and fatal effects produced by minute doses of an apparently innocent albumen. Guinea-pigs can be sensitised by a dose of 0·00001 c.c. of horse serum.

This same disproportion of cause and effect is seen in examples of human anaphylaxis. Severe general anaphylaxis is produced by the sting of an insect in one individual, while the same noxa in another will only cause a slight transient local irritation.

The local anaphylactic reaction produced by tuberculin on the skin of a sensitised (tuberculous) person is a very definite local lesion, but in an unsensitised (non-tuberculous) person the same amount of virus will produce no effect.

In the tertiary stage of syphilis "the gumma is a true anaphylactic phenomenon" (McIntosh¹⁶). The same writer says with regard to parasyphilis that "the very extensive lesions without the presence of *spirochaeta pallida* in any number must be due to the action of minute quantities of *syphilis toxin* on highly sensitised tissues." (The italics are mine.)

Do these cases of acutely fatal pneumonia in infants and others, and do cases of scrofula show evidence of weakness of virus? Let us take first the cases of fulminant institutional pneumonia. At first sight it seems absurd to suggest that in illnesses so rapidly fatal the pneumococcal poison was weak in its quality or amount; it seems reasonable to suppose it was highly virulent. But yet the

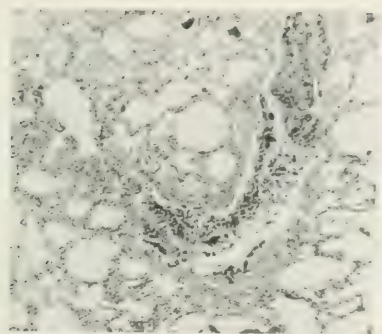


FIG. 5.—Section of lung from F. B., aet. 12 years. Pulmonary metastatic carcinoma. Shows a bronchus, cut in longitudinal section, its lumen filled with desquamated epithelium.



FIG. 6.—Case of sarcoïdosis. Mary Carr, 4 years. Shows intense cutaneous reactions to human and bovine tuberculin, producing two ulcers with complete destruction of the whole skin.

following facts support the former hypothesis:—Pneumococci were, in many of the cases, cultivated only with difficulty from the lungs. Further, these fatal fulminant pneumonias were accompanied by non-fatal cases of illness. In this one school, and over a period of some ten years, 226 such cases were collected by McGowan and myself.¹³ Though the symptoms of onset in these were similar to those of the fatal group, yet in the 51 cases where pulmonary consolidation became a demonstrable clinical fact its area was in the great majority small, and, as described by the medical officers of the school, of an extent covered by the chest-piece of the stethoscope; and of these limited cases of pneumonia only one died. There remained a large group of 175 cases, termed by us abortive pneumonia, because though the general signs and symptoms were those of the other two groups, the local physical signs of pneumonia were entirely absent. It is therefore not an unreasonable explanation that the fatal issue in the fulminant group was due, not to a gross or virulent poisoning by pneumococci, but to a hypersensitive (anaphylactic) condition of the body.

As to the cases of scrofula, the evidence seems to point in the same direction. The statement of Birch-Hirschfeld, writing before the tubercle bacillus was discovered, is apposite in this connection. "The scrofulous constitution," he says, "is characterised by a peculiar inflammatory reaction of the tissues against *irritants of relatively even insignificant importance*." Further, cases of scrofula do not often die of general tuberculosis; indeed it is often said, and this by clinicians of great experience, that scrofulous children seldom become phthisical in adolescence. The tuberculous lesions of scrofula, severe as they are, present the picture of a tuberculosis, localised by the fiercely inflammatory reaction of the tissues. There is not seldom a failure to cultivate the bacillus from the caseous and purulent material of scrofulous lesions.

The severe local tuberculin reactions which characterise cases of scrofula, and which are illustrated in Fig. 6, can be explained in the same way. The ordinary or normal tuberculin reaction is accepted as an anaphylactic reaction; the intense reaction in scrofula, as in Fig. 6, is heightened anaphylaxis; and we have noted as one of the fundamental principles of anaphylaxis that the dose of the virus is small, while the reaction of the living tissue is disproportionately great.

In these various features, therefore—in the unusual congestion and œdema, in the suggestion of contracted bronchial muscle, in the rapid and intense destruction of epithelial structures, and in

the evidence, not of intensification of the virus, but of intensified reaction to the virus—the cases of fulminant pneumonia and of scrofula show a special stamp of pathological histology and physiology which is also the peculiar stamp of the phenomena of anaphylaxis, both experimental and clinical. And in both cases *it is not the ordinary but an extreme anaphylactic reaction which is shown.* In the cases of fulminant pneumonia the analogous type is to be found in the “immediate” reaction of a case of serum disease, in the cases of scrofula the experimental analogue is the Arthus phenomenon, that is, the local necrosis developing in the rabbit at the site of subcutaneous injection of horse serum where several injections of the same substance have been previously given.

(*To be continued.*)

RECURRENT LUXATION OF THE PATELLA.

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No medical practitioner can acquire much experience in his profession without there coming under his observation curious and troublesome cases of recurrent dislocation or subluxation of the patella. True traumatic dislocation of the patella is an uncommon event, and even surgeons of experience may only be able to recall one or two such cases, and in them the patellar displacement is often of minor importance to other coincident injuries. To cases of primary traumatic dislocation of the patella I do not propose further to refer in this communication. I desire only to consider a condition which is characterised by the outward displacement of one or both patella, and to offer suggestions as to how this condition may be brought about.

It is scarcely necessary to mention that the patella is a sesamoid bone developed within the tendon of the quadriceps extensor cruris. It articulates with the condyles of the femur over which it glides, and the shape of its articulation is modified to fit this trochlear surface. The prolongation upwards of the articular surface of the outer condyle, its comparative flatness in comparison with the corresponding articular surface of the internal condyle, and the fact that the outer border of the patella really projects beyond the edge of the articular surface, might be supposed to facilitate outward rather than inward dislocation. But more important

than all these together appears to me to be the fact that in full flexion, in the position in which such displacements are apt to occur, the articular surface of the inner condyle projects much further downwards than that of the outer condyle. These are normal anatomical features and subserve the functions of the joint, and obviously something more than these and the inter-relations of femur and patella is required to account for the occurrence of a subluxation at all. The patella is held in position by the capsule of the knee-joint and by the tension of the quadriceps extensor cruris. The capsule is made up of the ligaments of the knee supplemented by extensions from various tendons and from the fascia lata, and the lateral attachments of these to the patella are described as the lateral patellar ligaments, structures which are not too clearly insisted on by anatomists.

That recurrent displacements occur is well known, and one soon learns to conclude that a patient's statements as to the recurrence may be accepted in many cases as not merely the silly dictum of an ignorant bone-setter. The displacements occur during exertion, exertion which entails rapid flexion and extension at the knee. The subject of the displacement finds that his knee occasionally locks, but with care can be easily fully extended, and at once the patella slips back into position. Some patients are conscious that the patella has been displaced outwards, others only that with rectification it is replaced. There is no difficulty in recognising that one has not to deal with the so-called internal derangement of the knee-joint, that there is no question of a displacement or injury of a meniscus, and that the condition is not one which can be brought about by a loose cartilage in the joint. In those cases the joint locks, it is true, but full extension is not possible; there is no question of displacement and replacement of the patella; and as a rule the injury is followed by more or less synovial effusion. It has been said, and frequently repeated, as these easy-going statements are apt to be, that a laxity of the capsule of the joint predisposes to, or is a material factor in, the production of a displacement. I doubt the accuracy of this suggestion. An effusion into the knee-joint produces a distension of the capsule, and the capsule must be looser than normal, especially after a recurrence, but it is not in such cases that lateral displacement of the patella takes place; otherwise we would certainly have it in these cases where synovitis had followed an injury to a meniscus or the presence of a loose cartilage in the joint.

Again, it has been said that displacement of the patella is predisposed to by the want of firmness of the ligaments in youth, and it appears as if there were something more to be said for this supposition than for the previous one, because it is undoubtedly the fact that subluxation of the patella begins in the immense majority of cases, if not always, in young persons. What is meant by an undue laxity of the ligaments? It would be difficult indeed to demonstrate that the ligaments were in any degree more loose, more stretchable, less well developed in one person than in another, always of course in proportion to the general individual development. Does the freedom of movement which pertains in some youths depend on the ligaments at all? It is true that in certain young people there is a freedom of movement in the joints which does not obtain in others, and here I take it lies the explanation; not indeed that there is any abnormality about the ligaments, but that there is an abnormality, if it can be called so, about the joint; that the joint is more widely movable than normal, and such joints being more freely useable are more liable to injury.

The patella remains in position in virtue of an intact capsule, by the proper development of the constituent muscles of the quadriceps extensor, and by the normal axis and relationship of the bones of the limb. To take the last first, it is an everyday observation that where the axis of the bones is changed, as it is in marked knock-knee, the patella is placed outwards in virtue of the deformity. There are certain cases, however, in which an abnormality of the femur produces an alteration in its axis, the abnormality probably being a congenital defect, but the luxation of the patella subsequently acquired as the line of action of the muscles is altered. In many of these limbs the action of the knee-joint is abnormal, the development of the articular surfaces must be anatomically peculiar, and there are often in association other congenital defects.

The quadriceps is composed of four muscles, the vastus internus, the vastus externus, the rectus femoris, and the crureus. These muscles envelop the thigh bone, converge to the patella, and end in its ligament. A weakness, if one may so term it, in this combination of muscles is their nerve supply. These huge muscular masses are supplied by long separate branches of the anterior crural nerve through the third and fourth lumbar nerves by way of the lumbar plexus, and each branch or set of branches to any division is very distinct from that to any other part of the muscle.

To retain the patella in proper position by muscular effort it is necessary that the constituents of the quadriceps should act in unison, and should anything interfere with their even and simultaneous pull on the patella and its ligament, surely an alteration in the position of the patella must be the inevitable result. If any component part of the muscle or its insertion into the patella be divided or stretched, the pull on the patella will not occur equally and displacement will be produced. Let me give an example.

A little girl, some four years of age, was playing in a garden and running from one who was chasing her. She suddenly and voluntarily sat down on her heels, her hips and knees being in full flexion, and her pursuer inadvertently fell over her, producing an excess of flexion in the right knee. This was followed immediately by pain, and the child cried, and was unable to walk and was carried into the house. There was no difficulty in putting the limb in full extension, and it appeared as if little injury had been inflicted, and no subsequent discoloration was noticed. The child walked carefully for a day or two, and thereafter returned to her usual habits. Some months afterwards while at play something happened to the knee and the child fell, and this occurring in intervals during a series of years, advice was sought and the condition investigated. It was then found that the quadriceps extensor was not pulling equally in its proper axis, and apparently the accident at the age of four had ruptured some part of the attachment of the muscle at the inner side of the patella, or overstretched or torn the internal lateral patellar ligament, so that there was a constant tendency to outward displacement of the bone, a tendency which was aggravated during the extremes of movement. There was no alteration in the axis of the bone or, as far as one could judge, in the condition of the articular surfaces. I have seen other cases where such a history has been obtainable, the original injury in childhood or early youth, the subsequent trouble occurring until the activities of adolescence were interfered with. Such people are handicapped in tennis and cricket, and such violent games as football, boxing and hockey are inadmissible.

It is not always possible to get a definite history of traumatism, and amongst the better classes of society one must accept the possibility that something else may bring about the displacement than an injury, and this possibility is rendered more certain by the fact that the condition may be bilateral. A bilateral condition does

not occur in normally developed persons simultaneously, so far as I know, but one knee precedes the other in affection. Some weakness of the muscles is often apparent. There is a want of firmness, and if the condition is unilateral an unequal development is noticeable of the two limbs, and in this I think lies the explanation. In some of these cases we certainly get a history of an early diphtheria, and in some a history of what might have been an anterior poliomyelitis. But we all know it is possible to have an attack of the latter so slight that its incidence is overlooked or readily forgotten, and it is as certain, though perhaps the possibility is not so universally allowed, that a post-diphtheritic affection of voluntary muscle may occur before the primary diphtheria has been recognised. Here are two conditions in which a paralysis of a part of the quadriceps or simply a weakening of the muscle may bring about a condition in which the activity of the muscles pulling the patella one way is not counterbalanced by the action of the rest of the quadriceps. The conditions brought about are the same as in the previous cases and subluxation results, and I would strongly urge that in an investigation of any case of idiopathic luxation there should never be omitted a very full and careful investigation of previous illnesses, and particularly of those during childhood.

As alteration of the axis may bring about unequal action of the component parts of the quadriceps muscle, so it appears an irregular development or innervation of the quadriceps in the foetus, or in the early years of life, may bring about an alteration in the development of the bones. In the former condition the bones are primarily at fault, the muscles secondarily; in the latter the muscles are primarily to blame and the osseous changes follow. That such alteration in the bones occurs I think can scarcely be doubted. Photographs of such a condition taken from a girl aged 13 show in the erect position (Fig. 1) the inequality of thighs due to the interference with the muscular development, the slight tendency to knock-knee, the production of a talipes valgus or knock-ankle. In the erect position the patella seemed slightly displaced outwards, but when the child lay recumbent, when the thighs were semiflexed and the knees fully flexed, then the patella on the affected limb slipped clear to the outer side lying between the outer condyle and the tuberosity, the knee lost the rounded appearance which the patella gives its apex and became instead flattened, with a depression corresponding to the intercondyloid notch which is characteristic of this condition (Fig. 2). Something

FIG. 1.

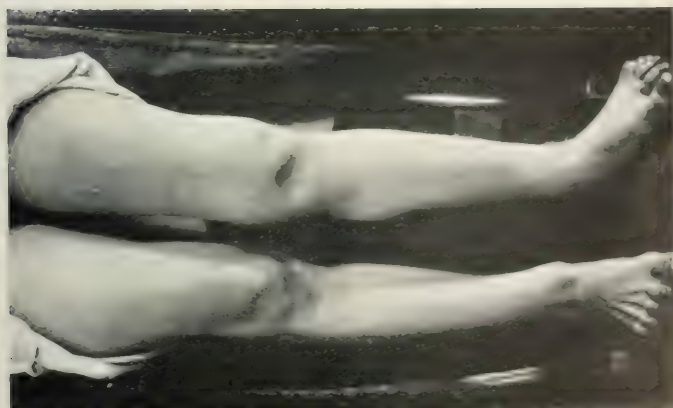


FIG. 1.—Contracted left paretic, showing tendency to plantar flexion and inversion.

FIG. 2.



FIG. 2.—Abnormal foot of left paretic, showing tendency to plantar flexion at rest. In standing and walking, foot becomes more of normal type (right).

very similar I saw only a few days ago in Professor Stalker's ward. A mentally defective child, aged 13, the subject of marked inherited syphilis, had had some muscular affection in the left lower limb so that that limb was not so fully developed as its fellow. There was a certain amount of spasticity of the muscles, and in full extension of the left leg the patella obtained an excursion quite abnormal, and in full flexion it was displaced even further to the outer side than in the previous case, and a peculiarity was a ridge from the displaced patella to the tibial tubercle formed by the ligamentum patellæ passing in front of the head of the tibia.

I have not sought to illustrate every variety of the deformity, but I may sum up as regards the etiology that complete or partial luxation of the patella may be due to (1) traumatism; (2) defective development of the bones; and (3) imperfect action of the muscles, in which of course is included the cerebral or spinal affections which pervert their proper function.

To what practical conclusion does this consideration lead us? The conclusions are several. First, in the treatment of recurrent luxation of the patella, confinement to bed and the application of splints are unnecessary. Second, there is no actual surgical interference which will improve the condition unless such an obvious abnormality as knock-knee demands rectification. Third, as long as violent games are avoided the recurrence of the dislocation may be prevented by the application of a firm and well-fitting leather knee-cap. The ordinary elastic knee-cap is neither adequate nor desirable, for its tightness is apt to bring about by pressure an atrophy of the underlying soft parts and an interference with the circulation in the cutaneous veins. A soft leather knee-cap lacing up the side and with a hole for the patella is the cheapest in the long run and quite efficient.

DR. THOMAS SPENS: THE FIRST DESCRIBER OF THE STOKES-ADAMS' SYNDROME.

By C. EDGAR LEA, M.D., M.R.C.P.,

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I wish to direct attention to what I have little hesitation in naming as the first undoubted case of the syndrome, now known as the Stokes-Adams' disease, described by a British writer. The case was published in the year 1793 by a Scottish physician, resident in Edinburgh, named Thomas Spens.

I propose to note, firstly, the evidence which establishes the

priority of Dr. Spens' case over those hitherto held to have been the first described; secondly, to epitomise, in the words of the actual text of the description, the features of the case which clearly denote its character as a true instance of heart-block with its associated syncopal and epileptiform attacks; and finally, to mention what I have been able to find out about Dr. Spens, whose name in this association ill deserves the oblivion of 120 years.

Early Records of Heart-Block.—Robert Adams of Dublin reported, so it is claimed, the first clear case of heart-block in 1827. In the same year a similar case was reported in great detail by Dr. William Burnett, who also called attention to the fact that Morgagni had described two cases of "epilepsy with slow pulse" in 1761. In 1841 Holberton recorded another case, but general attention was not directed to this condition until William Stokes, also of Dublin, published four cases in 1846.

It will be seen, then, that Dr. Spens' case preceded all these, with the exception of the two reported by Morgagni. Spens' case precedes Adams' and Burnett's cases by 48 years and Stokes' cases by 53 years.

Description of the Case.—The account of the case is to be found in a book of some 592 pages, entitled *Medical Commentaries for the Year MDCCXCII.*, "Exhibiting a Concise View of the Latest and Most Important Discoveries in Medicine and Medical Philosophy, collected and published by Andrew Duncan, M.D., F.R.&A.S.S.(Edin.)." The book was published in the year 1793 in Edinburgh. Mr. Graham, the Librarian of the Royal College of Physicians of Edinburgh, tells me that this publication was begun in 1773 under the title *Medical and Philosophical Commentaries by a Society in Edinburgh*, and that there were twenty volumes in all (1773-1795). With the seventh volume the title changed to the one above mentioned. Each volume has a separate dedication to some person of rank or quality of the time. The volume for 1793 is dedicated to Dr. Thomas Fowler of York. The case is to be found on page 463, and is entitled "History of a Case in which there took Place a Remarkable Slowness of the Pulse," communicated to Dr. Duncan by Dr. Thomas Spens, Physician in Edinburgh. It begins:

"On the 16th of May 1792, about 9 o'clock in the evening, I was sent for to see T. R., a man in the 54th year of his age, a common labouring mechanic. . . . I was much surprised, upon examining the state of his pulse, to find that it beat only twenty-four strokes to the minute. These strokes, however, as far as I

could judge, were at perfectly equal intervals, and of the natural strength of the pulse of a man in good health. He informed me that about three o'clock in the afternoon he had been suddenly taken ill whilst standing in the street; that he had fallen to the ground senseless; and that, according to the accounts given him by those who were present, he had continued in that state for about five minutes. . . . From the time of his first attack till I saw him he had been affected with three other fits, mainly of a similar nature. These, however, were attended with some convulsive movements of his limbs, and with screaming during the fits . . . nor had he at any time any other complaint. . . . Upon visiting him on the morning of the 17th, I found that he had been attacked by several fits during the night. . . . Upon examining his pulse I found that it beat only twenty-three strokes in the minute . . . an hour after I found it in precisely the same state as before. He was now directed to take some spirits of hartshorn; but, by mistake, it was given him very little diluted, and produced much uneasiness in his mouth and throat. From this cause I found him in great distress at one o'clock; but it seemed to have produced no change in the state of his pulse, which at this time beat twenty-four beats in a minute and was of the same strength and regularity as before. . . . In the morning of the 18th I was informed that . . . he had been frequently faint . . . his pulse beat only twenty-six strokes in the minute. About 8 in the evening he had no sooner smelt it [newly toasted bread] than he felt some of the sensations of a beginning fit; and, as soon as he had tasted it, he almost instantly cried out, and fell back senseless, with smart convulsions of all his muscles. He apparently recovered in a few seconds; but hardly any pulse could be felt for a good many seconds. On the morning of the 19th I learnt that . . . he had been attacked with frequent fits attended with violent convulsions . . . at three in the afternoon I found that it (the pulse) beat only ten strokes a minute, though it still continued equally strong and regular as before . . . he expired on the 20th. The day after his death the body was opened by Mr. Fife, and, upon the most careful examination, no morbid appearance of any consequence could be discovered either in the thorax or abdomen."

All the features of the case point to its being an undoubted example of heart-block—the slow regular pulse, the occasional faints, losses of consciousness, and convulsions, during which, if prolonged, hardly any pulse could be felt, are typical. Especially to be noted is the undisturbed pulse-rate even under the distress

occasioned by the too strong hartshorn, this static character of the pulse under varying circumstances being a striking feature of heart-block. Dr. Spens, finally, has evidence that two years previously the pulse of the patient presented no abnormality.

*Dr. Thomas Spens.**—For what information I have been able to gather about this celebrated physician I am indebted to Dr. Byron Bramwell; W. G. Spens, Esq., his grandson; Dr. Graeme Dickson, his grand-nephew; and T. H. Graham, Esq., the Librarian of the Royal College of Physicians of Edinburgh; and I would here express my thanks for their courtesy and kindness.

Dr. Thomas Spens was a distinguished Edinburgh physician. He was the son of an equally able physician, Dr. Nathaniel Spens, a gentleman who was apparently also well known as an archer, for he was a member of the Royal Archers (King's Bodyguard for Scotland), and his picture, painted by Raeburn, now hangs in the Royal Archers' Hall in Edinburgh. His son Thomas also became a member of the Royal Archers, and in the same year that he was elected to this august body he was admitted a Fellow of the Royal College of Physicians, at the early age of twenty-five. He appears to have served the College well, for we find him successively Librarian, President, and for the last 33 years of his life, Treasurer. He was an ordinary physician to the Royal Infirmary, Edinburgh. His known published works are six in number, including his M.D. Thesis, "*De Amenorrhœa*," dedicated to his father. Three of his papers deal with cardiac conditions. He died in Edinburgh in the year 1842. Of the traits in his character or his personal appearance I have been unable to find anything, but we imagine that he was not without a certain pride in his ancestry. We must assume that this quality was at any rate present in his father, Nathaniel, for we find that after a long career in Edinburgh he was enabled to redeem a portion of the family estates of Craig-Sanguhar in Lathallan, which had been sold by one Alexander Spens 300 years previously. To this eyrie Nathaniel, of whom we learn from one source that "he early practised as a surgeon, but later became a physician," and from another source that "he appeared to have been more famous as an archer than as a physician," in due time hied himself, and was gathered to his fathers at the ripe and honourable age of 88.

It is an interesting fact that the first article published in this *Journal* (January 1805) was by "Thomas Spens, M.D., President of the Royal College of Physicians, and Physician to the Royal Infirmary of Edinburgh." The subject was "*History of Three Cases of Erythema Mercuriale, with Observations.*"—[Ed. *E. M. J.*]

Not all the family estates, however, had been thus alienated, for Dr. Thomas Spens' grandfather had lived at Lathallan. Should further proofs of the distinguished ancestry of Dr. Thomas Spens, the discoverer of the first British case of heart-block, be required, there is evidence that they claimed descent from the ancient Earls of Fife, and it is certain that they bore on their arms the lion rampant of the MacDuffs. Dr. Thomas Spens never lived on the lands of his ancestors. He had the luck to be born a second son, and died where he had laboured—in Edinburgh. His elder brother, Colonel Spens, resided at Lathallan, and so Thomas remained in the grey city till he passed away at the age of 78.

CLINICAL RECORD.

CASE OF CHRONIC PRIMARY PNEUMOCOCCAL CEREBRO-SPINAL MENINGITIS.*

By CHARLES KERR, M.B.,

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AN illness which runs a protracted course and presents, in its early stages at least, difficulty in diagnosis, is always worth recording; hence my excuse for bringing these notes before you to-night. The patient was an unmarried woman, aged 41, a jute-weaver, the fifth child of a family of eight, two of whom were dead. One sister died, aged 13 years, of scarlet fever; the other, an epileptic, died at 38 after a series of severe convulsions. The mother died at 64 from chronic bronchitis, the father at 52, the result of an accident. There was nothing else of importance in the family history. The patient herself had always been strong and healthy, had no illness of any consequence—the proof of this being demonstrated in the fact that she had worked 27 years in the same factory, the only lost time being a few days off with an occasional cold—was always of a bright, lively disposition, a great reader, and an industrious sewer at home. She was first seen on 22nd September, and the following history obtained:—Had been out of sorts for two or three weeks, feeling tired, with “sore bones” at the end of the day’s work, not rested with sleep, and going to work more tired in the morning than at night. On 20th September was sick and vomited, was feverish, complained of sore throat, headache, and backache. When seen on the 22nd, complained of pain in head, as if bound by a band of iron; also aching pain in back and legs, and across the abdomen. Temperature 99·8°, pulse 88. Was rather pale, but well nourished; tongue had brownish-white film, tonsils slightly red and swollen, no signs of ulceration, no discharge from nose or ears. Nothing abnormal found in any of the systems.

* Read before the Forfarshire Medical Association, 2nd April 1914.

no swelling in any joints. Remained in much the same condition for a few days, temperature going higher, and showing a diurnal variation; tongue more furred and dry, abdomen distended and tender, especially over the right lower half, bowels constipated. Developed a short, slight cough, and a few moist sounds were heard at the back of chest. At the end of a week half a dozen small red spots were seen on abdomen, splenic dulness was increased; patient was very thirsty, and the bowels had not moved; had taken nourishment—chiefly milk and soup—well. Urine concentrated, and showed deposit of urates; no albumin. Headache was not so severe; pains in legs and abdomen; slept well. Her sister was of opinion that she had typhoid fever, her symptoms being so like those of a brother whom she nursed about ten years previously with typhoid. I was willing to agree, and a diagnosis of typhoid was made and the case treated as such. For four weeks the illness ran an uneventful course, the temperature being irregular—never reached beyond 102.4° —and gradually fell to normal on 28th October at the end of the fifth week. It, however, did not show the characteristic features of a typhoid chart. At the end of the second week she became very deaf, the deafness lasting about three weeks; there was no ear discharge. Great thirst, especially during the night, was a marked feature, so always was constipation, the bowels being moved only after large doses of castor oil. The appetite was good—always able to take large quantities of milk, soup, beef-tea, light puddings, eggs, etc.: her mental condition was normal, took great interest in her illness, had no pain after the first two weeks, only complaint being abdominal discomfort, and weariness with the confinement to bed. She occupied her time with reading and needlework. The temperature remaining normal for a week, she was allowed out of bed for a short time on 1st November. The temperature rose to 100° the second day after being up, but fell to normal again after the bowels had been moved, and kept normal till 8th November. On 7th November was up sitting in a chair for a few hours as usual and was feeling quite well, but after going back to bed in the evening became suddenly delirious. I saw her about nine o'clock, and she appeared not to know me—talked in a rambling fashion about all sorts of things. The delirium lasted for five hours, when she fell asleep, and appeared to be quite herself next day. On the evening of the 9th, when her bed was being made, had what her sister described as a shivering fit and faint. During the night had incontinence of urine, and next day complained of severe pain in the lower part of her back, especially on movement. The temperature rose again. By this time the faith in my diagnosis of typhoid, which had never been very strong, was lost, for a Widal was found to be negative, and blood examination showed a distinct leucocytosis, which is not found in typhoid. This necessitated a careful revision of the case and a fuller history previous to the acute onset of the illness.

The following fresh facts were obtained:—The feeling of tiredness and languor which had previously been stated to be of a few weeks' duration were found to date back to the middle or end of June. Work about that time (according to her sister's statement) had begun to be irksome, so much so that she had determined to have a longer holiday than usual. Her relatives saw nothing amiss, though friends thought she was losing flesh and colour. There was no history obtained of any shivering, headache, earache, or ear discharge, sore throat or cough, or joint pains. She took a three weeks' holiday and appeared to be the better for the rest, but after her resumption of work in the middle of August the old feeling of tiredness returned, with occasionally back pain. During all this time her appetite was good, and there was neither constipation nor diarrhoea. I have diverted somewhat from the clinical picture to introduce these points, which in the light of subsequent events are of some significance, though it is possible that if obtained at the beginning of the attendance, I might not have given them the important place they deserved, as a feeling of exhaustion lasting over a period of two months or more in one who has worked for 27 years in a factory, with an annual holiday of only a week, might not have appeared unnatural. A careful examination of the patient could detect nothing definite. Lungs, heart, kidneys, eyes, were normal; there was no headache; hearing had returned. The temperature had become normal and subnormal, pulse was quiet and good, bowels still constipated, occasional incontinence of urine. Since the onset of the delirium she had lost flesh, though plenty of nourishment was taken. The legs were especially wasted, knee-jerks exaggerated, plantar reflexes, of a flexor type, very acute. No Kernig's sign, no loss of sensation, no evidence of any gross nervous lesion. Her mental condition, however, was dulled; she gave up reading, lost interest in her surroundings, and spent most of her time in sleep. She was not inclined to conversation, answered questions slowly and deliberately, but quite intelligently. Professor Stalker saw her on 1st December, and as no definite signs could be obtained, he was inclined to the opinion that the illness might have been typhoid, and the present state was probably due to auto-intoxication, following the severe constipation, and vigorous purgation was indicated. This had no beneficial effect, and the mental stupor gradually became more marked. Shortly after this two bed-sores formed over the buttock, and peculiar cataleptic symptoms manifested themselves. When turned over on her side by the nurse would remain so for hours; if her legs were flexed no attempt was made to straighten them, but if asked to extend them did so slowly, and could also draw them up on request, and would also slowly turn round on to her back; a similar condition existed in the arms. Her cerebration was very slow; would reply to questions after a few seconds'

interval, always gave a correct answer, and appeared to be quite cognisant of what was going on. Always recognised the nurse and myself in our daily visits, also her friends, but after speaking for a few minutes would shut her eyes and fall asleep. Was able to read a Christmas letter received from a brother; recognised the post-mark—Hong-Kong—and spoke of the contents of the letter, which she related to Professor Stalker, who saw her again on 23rd December, when, I am afraid, I persuaded him to agree with me that her condition was more a mental than a physical one. Shortly after his second visit her lethargic state became more pronounced, but she still continued to take large quantities of nourishment, in spite of which, however, she slowly lost strength and flesh, and became very exhausted. Had continuous incontinence of urine, and occasionally incontinence of feces. Her knee-jerks had gone, plantar reflexes acute, no Babinski, no Kernig, stiffness in arms and in neck muscles. Eyes again examined and found to be normal. She was seen by Dr. Mackie Whyte at the beginning of January, and he was of opinion that her general condition now pointed to some cerebro-spinal affection, and suggested lumbar puncture as a means of clearing up the diagnosis and perhaps relieving the cerebral pressure. As I had twice, on other patients, tried lumbar puncture with a negative result, not being able to strike the canal, I was somewhat doubtful of my ability to perform the operation successfully. However, on 9th January, without any difficulty I got into the spinal canal and withdrew about 10 c.c. of fluid. The fluid came away under increased pressure and was quite clear. With the assistance of Dr. F. M. Milne it was examined and found to contain a small amount of albumin, no sugar. On centrifugalisation a very slight deposit was obtained, which, on staining, showed many leucocytes (polymorphs) and numerous pneumococci, and the diagnosis of pneumococcal meningitis was made. A blood-serum culture was negative. On the suggestion of Dr. Whyte and Dr. Milne I put the patient on to 10-gr. doses of urotropin four times a day, urotropin having been found in several cases of cerebro-spinal meningitis to have been wonderfully effective. The spinal puncture had little or no effect on the state of the patient, except that perhaps for two days she was slightly less drowsy. Nor did the urotropin seem to benefit her. I then gave her 10 minims vaccine of pneumococci on 18th January, and I almost think she was worse afterwards. Other bed-sores had developed early in January on her shoulders. A very marked tache cerebrale could be obtained, and Kernig's sign was obvious and very distinct. Rigidity in the arms, especially the right, was marked; movement of the limbs was apparently painful. The head became turned to the left, with great stiffness in the neck muscles; the legs were kept flexed at the knee, but could be extended. Spinal puncture was again performed on 24th January. The fluid, as before, was quite clear,

the deposit was greater, cellular elements were increased in number, and the pneumococci were more abundant. A blood count made at this time showed red corpuscles 4,500,000, whites 23,000, a distinct polymorphonuclear leucocytosis. The differential count—polymorphs 85 per cent., small lymphocytes 8 per cent., large lymphocytes 6 per cent., eosinophils, large mononuclear and transitionals 1 per cent. On 26th January there was conjugate deviation of the eyes to the left. Patient only roused with great difficulty; swallowing not easy. No reply given to any question; opened eyes and seemed to know what was said, *e.g.* would attempt to put out tongue. 28th January, face very flushed, external strabismus, right conjunctiva insensitive, right arm limp. Respiration slightly Cheyne-Stokes in character, pulse very weak and irregular. 29th January, face and whole body covered with copious perspiration; right arm quite rigid, also legs; rigidity of muscle of jaw, cannot open mouth; ptosis of right eye; still conscious. Marked Cheyne-Stokes' respiration. Temperature 98°, pulse 90, very irregular. 30th January, temperature 102°, pulse 130, very weak, quite unconscious, ptosis more marked, pupils contracted and do not react, conjunctivæ insensitive, eyes rolling from side to side, rigidity more marked, face very flushed, and whole body very moist. Died at 9 A.M. on 31st January. No post-mortem obtained.

Such, then, is the clinical history of the case which I have called one of chronic primary pneumococcal cerebro-spinal meningitis. Justifiably chronic owing to the long duration—from the middle of June 1913 to the end of January 1914—7½ months. I do not think there can be any doubt that the feeling of lassitude and occasional backache experienced in the early summer must have marked the onset of her trouble—the period of invasion of the nervous system by the organism—and that the symptoms in September were due to an acute exacerbation, it and the subsequent distress being one and the same disease. I have called it primary because I was quite unable to find a focus for the original infection, and frequent careful examinations revealed no disease in any organ. There was no history of prolonged sore throat, ear trouble, pneumonia, endocarditis, or old tubercle: no sign of vaginal discharge. The source of entrance of the pneumococci to the spinal canal must have been some undiscovered focus in the tissues, where pneumococci were produced and slowly poured into the system. That the organism was a pneumococcus was demonstrated by the fact that it was Gram-positive in its staining, was extra-cellular, and showed a distinct envelope with the characteristic arrangement of the two cocci. *Diplococcus intracellularis* and *gonococcus* are Gram-negative.

It may well be asked why was a diagnosis of typhoid accepted? Well, in the autumn of a year which has been glorious in an exceptionally dry summer, typhoid is, no doubt, more prevalent than at other

seasons; this was so, there being several cases of typhoid fever in the neighbourhood. A continued fever, with abdominal discomfort and the other symptoms already enumerated, led to the error. Had a leucocyte count and a Widal been done earlier in the illness the mistake would have been prevented. Having made the diagnosis, there appeared no reason for altering it until the onset of the delirium. A spinal puncture done then would probably have cleared up the case earlier, but, as I have before said, previous failures had shaken my confidence, not in the method, but in my ability to perform the operation successfully—a possible difficulty which may have confronted many another practitioner. I have, however, now no hesitation in recommending it as a means of diagnosis, even after three failures, just as readily as one would explore the pleural cavity in a doubtful area of dulness.

The literature on cerebro-spinal meningitis is in the greater part devoted to consideration of epidemic cerebro-spinal meningitis, the disease caused by the meningococcus, the diplococcus intracellularis, or to tubercular conditions, and though the pneumococcus is mentioned in most books as a causal factor, I have not come across any recorded cases other than those associated with distinct pneumococcal lesions elsewhere. The spinal fluid in pneumococcic meningitis is said to be purulent, like that of meningococcic meningitis, but the fluid in this case was quite clear on both occasions.

Dr. John Ritchie reported, in 1910, a case of relapsing cerebro-spinal meningitis, of meningococcal origin, where the patient had six relapses during an illness of $8\frac{1}{2}$ months. In the *Australian Medical Gazette*, 1912, Campston gives an account of an outbreak of cerebro-spinal meningitis in Perth, Western Australia, during January to July 1911, in which micrococcus catarrhalis was found in the spinal fluid.

I have to thank you for your kind attention to rather a lengthy tale. The lesson is obvious; do not neglect Widal in continued fever, nor spinal puncture in cases with indefinite nervous phenomena.

REPORTS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

A CLINICAL meeting was held in the Royal Infirmary on 20th May 1914, Dr. John Playfair, President, in the chair.

Dr. Dawson Turner showed a woman, aged 37, after treatment by *radium* of a recurrent carcinoma of the breast. There had been great relief of pain and gradual disappearance of the growth.

Mr. John Fraser showed a child, aged 5, who had suffered from tuberculous disease of the left middle ear and mastoid with facial paralysis. Operative treatment failed to relieve the paralysis. Tuberculous adenitis supervened. The glands were excised and the facial nerve was joined to the spinal accessory.

A portion of the external jugular vein was excised and used to close the wound. The paralysis was in course of recovery.

Mr. Alexis Thomson showed—(1) A patient who had suffered from *extradural suppuration* after head injury. There had been an extensive Pott's puffy tumour, which had aided diagnosis and been a guide to the extent of the suppuration. (2) A boy after *resection of the humerus for sarcoma*. After removal of the middle third of the bone recurrence took place in the lower part. A second resection was done in 1910. In each case a portion of fibula had been used to fill in the gap. There had been no further recurrence and the humerus had grown.

Dr. Fleming showed a patient with a remarkable degree of *acromegaly* and a patient suffering from *glycosuria*. There was no polyuria, and Fehling's test gave a black precipitate, due to the formation of colloidal copper unless the urine was first diluted.

Mr. Wallace showed a man who had done well for over a year after a short-circuiting operation for *carcinoma of the hepatic flexure*; he also showed *renal calculi* with large acicular crystals on their surface.

Mr. Wilkie showed a case of tabes benefited after an extensive *resection of posterior nerve roots* for gastric crises.

Dr. Chalmers Watson showed a case of *ileal stasis*.

Dr. W. T. Ritchie and Mr. J. M. Graham showed a patient greatly improved after direct *transfusion of blood* for pernicious anæmia.

Mr. Dowden showed a patient who had good power of locomotion in spite of absence of the head and neck of the femur from *Charcot's disease*; and a woman after insertion of a bone graft from the crest of the tibia for ununited fracture of the neck of the femur.

Professor Caird showed two cases after operation for *depressed fracture of the skull*.

Dr. Charles McNeil showed cases of *dyspepsia in children* benefited by treatment with emulsion of liquid paraffin.

Mr. Cathcart showed a patient who had recovered walking power after complete paraplegia following *fracture of the lumbar spine*.

Dr. Boyd showed a case of *bronchiectasis* treated by oxygen replacement and artificial pneumothorax, and a case of *diabetes* illustrating the benefit which may follow an "oatmeal cure."

Mr. Beesly showed a girl after *resection of the shaft of the ulna* for tuberculosis.

Mr. Scot Skirving showed a man after removal of the upper jaw, the left eye, and part of the nose for *epithelioma*.

A MEETING was held on 3rd June 1914, Dr. Playfair, President, in the chair.

Dr. Chalmers Watson showed a series of X-ray photographs illustrating cases of *ileal stasis*.

Mr. Douglas G. Reid, Cambridge, gave a communication on "*Jackson's Membrane and the Genito-mesenteric Fold of Peritonæum*." Peritoneal adhesions might be anatomical or pathological. In the foetus apposition of peritoneal surfaces without movement might lead to anatomical adhesions. The genito-mesenteric fold passed from the region of the lower end of the ileum to the right ovary and Fallopian tube. Pressure on the fold by the pelvic colon might displace it and bring about adhesions involving the cæcum and pelvic mesocolon. Jackson's membrane might be due to adhesion between appendices,

epiploicæ of the ascending colon, and the parietal peritoneum. Bowel flexures might be produced by these adhesions, and abnormal positions of the appendix might be accounted for by cæcal torsion in foetal life. Mr. Cathcart said he was glad to have his findings as a surgeon corroborated that these folds were so commonly developmental in their nature. Adhesions might be present, but no obstruction followed unless there was some failure of peristalsis in addition. Mr. Wilkie said that three types of membrane were found in the region of the colon: (1) the normal parieto-colic fold; (2) an inflammatory parieto-colic fold; and (3) folds associated with ptosis of the cæcum. Mr. Beesly said that adhesions were more commonly seen by surgeons in living people than by anatomists in the dissecting-room.

Dr. Torrance Thomson and Mr. J. W. Struthers communicated a "Note on the Intra-tracheal Insufflation of Ether," which will appear in the *Journal*.

Mr. Hodsdon said he had been very satisfied with the method in an experience of 50 cases. He had found it especially useful in goitre, and thought the method had a great future. Professor Caird thought the method had merits in certain cases, but it was not generally applicable. It might be very useful in brain cases where there was a liability to cessation of respiration. In a limited class of case its usefulness might be very great. Mr. Scot Skirving spoke in favour of the method. In a case of excision of the upper jaw it had been extremely useful. Dr. J. S. Ross had used the method even in children. The introduction of the tube might be facilitated by painting the pharynx with novocain. Mr. Struthers said that the method gave a condition comparable to chloroform anaesthesia although ether was used. It had special advantages in mouth, throat, and thoracic operations. The after-results were neither better nor worse than with other methods.

Edinburgh Obstetrical Society.

A MEETING was held on Wednesday, 11th March 1914, Sir Halliday Croom President, in the chair.

Dr. James Young read a paper on the "*Etiology of Eclampsia and the Albuminuria of Pregnancy and their Relation to Accidental Hemorrhage*." He pointed out that it had long been known that placental disease was especially apt to be found in these toxæmic states. It was usually supposed, however, that this relationship was not a necessary one, because in very severe and acute cases the placenta often looked healthy. He showed that whilst this is so, there was always a massive recent necrosis in the placenta if some days had elapsed between the acute attack and the birth of the child and placenta. This discovery indicated that there was a necessary relationship, and that it was with the earliest, often unrecognisable, stages of the placental death that a toxæmia was associated. Dr. Young referred to the fact that it was not difficult to show that the chorionic elements depended directly and immediately upon the maternal blood for their nourishment, and, so long as this was not implicated, could live where there was no foetal circulation. In the earliest stages of development, when the chorion was growing most actively, there were no foetal vessels. In hydatid mole and chorion epithelioma, where there was a rich chorionic proliferation, the foetal circulation had disappeared. The same conditions could be shown in some cases of tubal pregnancy. All these facts showed that localised placental death or infarction could not be due to an involvement of the foetal vessels, but to an interference with the

maternal supply. From a study of the anatomy of placental disease, direct and indisputable evidence of this interference could often be shown. Over retro-placental clots infarcts were found. If recent they were dark red or purple, if older they were pinkish, yellow, or white. The different appearances found in infarction did not, as was usually believed, indicate that there were different kinds of infarcts, but merely that they were different stages in the same process. In the paler infarcts the haemoglobin had been split about dissolved out as the result of an autolytic process. This explained the increasing paleness of the older infarcts. The causes of this placental disease found in the toxæmias were merely an exaggeration of changes that were normally present in smaller degree. The ready tendency to infarction was due to the loose association between placenta and maternal wall with the consequent over-present risk of vascular interference. It was also due to venous thrombosis. In any case, it could be proved that the circulatory interference, which ended in placental death, was not due to a toxæmic state. This was especially demonstrated in accidental hæmorrhage. In these cases the placenta was invariably diseased over the blood clot, the extent to which this had gone depending upon the age of the clot. It could moreover be proved that the cause of this hæmorrhage was something apart from a toxæmia, for 50 per cent. of such cases were unaccompanied with any sign of poisoning.

The inevitable conclusion from these researches was that the placental disease was the cause of the toxæmia. In accidental hæmorrhage the cases in which a toxæmia was present would be those in which one part of the placenta remained attached to the uterus for some days. In such a circulation the toxic stuffs liberated by the adjoining dying placenta would be poured. If the placenta was completely detached, or was delivered early, there was no chance for the development of a toxæmia.

The President, Dr. Berry Hart, Dr. Ballantyne, Dr. Fordyce, Dr. Oghilvie Nicholson, Dr. Johnstone, and Dr. Cowan Guthrie discussed the paper. Dr. Young replied.

Dr. J. W. Ballantyne read a paper on "*Still-Births' Registration*," in which he pointed out the extraordinary diversity of practice which existed in different parts of the world, and even in different parts of the British Empire, with regard to the registration of dead-born and still-born babies, and in respect of the definitions of live, dead, and still-birth accepted for official use in these different places. There was a veritable jungle of legislative, official, and lexicographic divergencies of theory and practice. He was of opinion that the jungle had been entered by not following the straight path of the study of antenatal and intranatal physiology, and he thought that the only way out was to investigate and to re-state the conditions of life and death before and during birth. The word *still-birth*, for instance, should not be regarded as synonymous with dead-birth, but should be reserved for those cases in which there was a hesitancy in the smooth passage of antenatal into postnatal life; whilst not having put off the characters of the life before birth, the child showed a delayed putting on of those which marked life after birth. A still-born infant might be resuscitated or "*trans-animated*" (as he proposed to call it), and therefore it could not have been dead. He pleaded for a revision of the terminology of the subject before a Still-Births' Registration Bill stereotyped the definitions for ever. It was really an Antenatal Deaths' Registration Bill which was called for.

A MEETING was held on Wednesday, 13th May 1914, Sir Halliday Croom, President, in the chair.

A discussion was held on Dr. Ballantyne's paper on "*Still-Births' Registration*," read at the last meeting. At the outset Dr. Ballantyne said: "Mr. President, at your request I shall try to say something in a few words to link on the discussion of to-night with the reading of my paper some weeks ago. My paper was really a consideration of terminology, but the terms discussed had not merely an academic but a practical importance. There was no difficulty with 'registration' and 'notification,' but with the terms 'still-birth' and 'dead-birth,' and with the equivalents of these terms in foreign languages there was not only extreme difficulty, but also immense confusion. The great problem standing in the way of all attempts at definition was the fact that in many cases one had to wait a little while before being sure that any given birth was going to be a live-birth or not. Was the child going to be still or going to move, or was it so stilled before birth as to be for ever beyond the possibility of moving again? My explanation of the confusion was (1) a lack of adequate recognition of the physiology of antenatal life, and of the changes which occur or may occur at birth (the transition time between antenatal and postnatal life); and (2) the habit which the public with the connivance of the profession, and the profession itself in some places, had got into of regarding still-birth as a synonym of dead-birth. I have it from Dr. Amand Routh that a still-born baby is dead and cannot be resuscitated, and yet in obstetrical text-books and in the *Journal of Obstetrics* itself we read constantly of the treatment of still-births, and even of the best methods of resuscitating still-born babies! It was common to hear a medical man say, 'I was not sure whether it was still-born or dead.' Consequently, as Parliament was soon to bring in legislation dealing with 'still-births' and their registration, it seemed to me well to discuss the terminology of the subject before the words still-birth, dead-birth, live-birth, etc., were finally crystallised along lines which are erroneous. I drew up some definitions, and these, with some modifications which I regard as improvements, had been unanimously adopted by the council of the Society."

Dr. Leslie Mackenzie (Local Government Board) felt that three things hung together—the notification of births, the proper regulation of midwives, and the whole question of infant mortality. When the notification of births became universal it would mark an advance. The Local Government Board had practically decided, where the Act was not adopted, to have it done by themselves. He thought that along these lines the providing of proper training of midwives in connection with the Midwives Act would be good. It should include definite and special training in such aspects of the pathology of still-births as were desirable. He had some doubt as to whether the distinctions which Dr. Ballantyne had made, though scientifically precise, were of practical value. In spite of the risk of confusion, however, he thought that a vast amount of useful information could be got, even though some considered still-birth one thing, live-birth another thing, and dead-birth another thing, while others did not differentiate sufficiently between. He thought that even a limited amount of statistics in the hands of good men, such as the Local Authorities of Glasgow and Edinburgh, would be of great value. If the Registrar-General had to distinguish 5 forms of tuberculosis and 2 or 3 forms of pneumonia, it was not asking very much for medical men to make these distinctions as regards births.

Dr. J. C. Dunlop (Registrar-General's Department) agreed with Dr. Ballantyne as regards the general lines he had laid down. He considered, however, that notification, not registration, was the best method of acquiring and co-ordinating the information, because registration was not an administrative machine for the production of vital statistics. These were by-products. Registration was done by men with no medical knowledge, and there was no medical supervision of this machine until it was too late to make any inquiries which might be necessary under these circumstances. In regard to notification, there was, however, complete medical supervision. The registration of these cases, also, did not fit in with the established system in Scotland. The birth register only dealt with children who live in order that they might have, when they grew up, their civil rights established—old age pensions, for example. If one introduced other registers for miscarriages, dead-births, and still-births, he feared the ordinary system of registration would be upset. He would suggest three considerations why the medical officer should be directly notified—(1) the information is secret; (2) the information is passed on to a man with the technical knowledge necessary to appreciate it; and (3) it in no way complicates the present system.

Professor Harvey Littlejohn thought the chief function of statistics was not purely civil. Registration had been influential in the direction of preventive medicine. He thought that Dr. Ballantyne's definitions might be simplified somewhat. They wanted to know the existence of abortions and dead-born children. Let there be a general notification of dead-born children, whether they died some weeks before or during birth. This admittedly did not give all the information they wanted. But how were they to discover in ordinary cases whether a child died of syphilis, from the cord being round the neck, or from other birth causes? Then there were live-born children. He doubted whether still-birth was a useful definition. A thousand causes might give rise to it. If it became alive through the skill of doctor or midwife it should be called live-born.

Dr. Berry Hart thought that one could not limit the utility of registration to its civil value. It would give information regarding the causes of fetal death, syphilis, rickets, etc. He agreed that it was doubtful if the introduction of still-birth would be of any value. If a child lived only a few minutes it should be classed as dead-born; if it was still-born and lived for days it was a live-born child. As to abortions, he thought the statistics would be worthless.

Dr. Keppie Paterson thought that "Still-Births' Notification" would cover the case better. In maternity hospitals and in dispensary practice the information sent to the Medical Officer of Health would be valuable; not so as regards private practice generally. Many dead-births were syphilitic in origin, but the majority of those giving evidence before the Commission on Venereal Diseases were against compulsory notification. If the doctor were compelled to notify an abortion or dead-birth as syphilitic, there would be trouble. The husband would deny and refuse a Wassermann test. And if the cause of dead-births was not to be put in, where was the value of the statistics?

Dr. Freeland Barbour thought two classes of cases had to be distinguished—those in which the child died *in utero* and was expelled subsequently, at what time it did not matter, and those in which the child died during labour.

Dr. James Ritchie advocated the compulsory notification of births after 28 weeks' gestation.

Dr. Haig Ferguson thought that the idea of "still-birth" was so firmly established in the popular belief that for practical purposes it would be well to retain it.

Dr. Ballantyne, in reply, thought that notification might be the better method, but it would require serious consideration. He agreed it would be well if one could simplify the classification to include only dead-birth and live-birth, but there was a danger of losing scientific precision if one simplified too much.

Scottish Otological and Laryngological Society.

THE Society met in the Western Infirmary, Glasgow, on Saturday, 6th June. Dr. Walker Downie, President, in the chair.

The President showed a girl with *lupus of the soft palate, fauces, pharynx, and larynx*. Considerable improvement had followed the use of chromic acid locally, and syrup of the iodide of iron internally. Dr. Logan Turner suggested the treatment of such cases by nascent iodine with electrolysis, a method of treatment which can be easily carried out with the aid of suspension laryngoscopy. The President also showed a man, aged 57, who has had leucoplakia of the tongue and buccal mucous membrane for over sixteen years. No malignant change has taken place.

Dr. Kerr Love referred to a case in which he had watched leucoplakia of the tongue for a longer period and in which malignant disease had occurred within the past year necessitating removal of the tongue.

Dr. Walker Downie also showed a man whom he exhibited a year ago with *carcinoma of the ethmoid*. The disease has very slowly progressed, though the patient himself has kept in very fair health.

Dr. Thomas Barr showed a young man in whom, as the result of an accident, the *auricle* was *almost completely torn off*. It became permanently displaced forwards and the meatus became entirely occluded. Two years later a thin fetid fluid began to escape from a minute opening behind the auricle. After five years, during which time he had had attacks of pain, vertigo, and vomiting, he came under Dr. Barr's care. After milder measures had failed to effect a cessation of the discharge the radical mastoid operation was performed seven months ago. The result of this was satisfactory, a dry cavity resulting. There exists, however, a tendency to epithelial desquamation, which necessitates occasional syringing. Various remedies for this were suggested, but probably the condition will, of itself, disappear in time.

Dr. J. Galbraith Connal showed—(1) A case in which acute middle ear suppuration had been followed by a *Beroid's mastoiditis*, from which a pure culture of streptococcus was obtained. (2) A patient, a coal miner, whose *tympanic membranes were of a dark blue colour*. No doubt the colour is due to coal dust in the tympanic cavity. The interest of the case lies, as Dr. Kerr Love remarked, in the point that as coal dust gets into the tympanic cavities, so may other dust, and it is an interesting speculation how far dust may be a direct factor in the causation of adhesive processes in the middle ear. (3) A man who, when boxing, received a *blow on the larynx*, causing swelling of the inside of the larynx on the left side. The cord was more or less fixed and there was severe hoarseness. The condition is gradually passing off. The thyroid cartilage was not fractured. In this connection Dr. Walker Downie referred to four cases of *fracture of the larynx* from various causes, direct and

indirect, which had come under his observation. 1. A man on whom he had operated for *chronic middle ear suppuration* with labyrinthine and meningeal symptoms. On admission the caloric tests showed that the function of the left, the diseased, ear was destroyed. The radical mastoid operation was performed. The bony plate of the stupes was absent. The labyrinth operation was, however, not carried out. Three days after operation meningeal symptoms showed themselves: lumbar puncture gave exit to turbid fluid under considerable pressure. The fluid contained abundant polymorphonuclear leucocytes but no organisms. An injection into his spinal canal of his own blood-serum collected from blood withdrawn from a vein in the arm was made, on the suggestion of Dr. Shaw Dunn. Lumbar puncture was performed on several occasions, and the patient ultimately recovered. An interesting discussion took place as to the indications for opening the labyrinth in aural suppuration.

Drs. Henry Whitehouse and J. Gallweith Connal showed a patient operated on for *cerebular abscess*, the result of chronic middle ear suppuration. Dr. Whitehouse also showed a patient, a woman of 39, with *epithelioma of the hypopharynx*.

Dr. Mackenzie Booth submitted a short report on the treatment of *ceric forms of deafness* by Maurice's kinesiophone, and described the results in three cases in which it had been used. He was inclined to think this method had some value in the treatment of certain intractable aural conditions, though it remained to be seen whether the improvement, which certainly did occur in some cases, remained. Dr. Porter supported Dr. Mackenzie Booth in his attitude, and referred to a case in which marked improvement had followed this method of treatment. On the other hand, several members condemned the treatment as useless and savouring of charlatanism. It is hoped that at a future meeting members will bring forward records of cases carefully taken in which treatment by one or other of the forms of apparatus for auditory re-education has been used.

Dr. Lindsay Howie showed a man with a *thyreoglossal cyst*. The cyst was about the size of a pigeon's egg, and had been present since childhood.

Dr. Brown Kelly showed (1) a man with *endothelioma of the maxillary antrum*, and (2) a man suffering from *tuberculosis of the nasal mucous membrane*, chiefly in the region of the posterior part of the septum and of the middle meatus.

Dr. Brown Kelly and Dr. J. F. Smith showed some cases of *ozæna* treated by vaccine of Perez' bacillus. Though relapses had occurred, the vaccine seems to have a specific action and to be of more value than any of the multitudinous methods which have been used in the treatment of this affection.

Dr. Brown Kelly and Dr. Wm. Whitelaw showed a patient with *chronic recurring aphthæ of the mouth*, and recommended the use of arsenical compounds in this condition.

Dr. James Adam showed a patient in whom a *cholesteatoma* had practically performed the radical mastoid operation, and Dr. Neil MacLay showed a very large *cholesteatoma* removed from a patient by operation.

Dr. James Adam also showed—(1) A boy under *orthodontic treatment* to improve the width of the palate and of the nasal fossæ. Instead of the split plate actuated by a screw the pressure is continuous by means of a spring of annealed gold wire tied to the teeth. (2) Two cases of *Plaut-Vincenz infection* of the external and middle ear. Dr. Adam also showed a case of *malignant disease of the hypopharynx and isthmus of the gullet* in which apparent cure

has taken place under radium. Dr. Logan Turner, who also saw the patient before the radium treatment was commenced, was inclined to doubt the diagnosis. One well-known pathologist described it as definitely malignant, whereas another declared that he could not so describe the portion submitted to him. There is now no trace of growth to be seen.

Dr. Kerr Love reported two cases of *sudden non-syphilitic deafness* in young children, and took the opportunity of impressing upon the members the extreme importance of immediately beginning the teaching of lip-reading to these children while they still have some speech themselves. Dr. Love showed three interesting cases of recovery after operation for *intracranial complications of middle ear suppuration*, one of sinus thrombosis and two of temporo-sphenoidal abscess. In one of the latter the abscess opened spontaneously some days after the performance of the radical mastoid operation.

Dr. W. S. Syme showed a patient in whom no recurrence has taken place after an operation nine months ago for primary malignant disease (*endothelioma*) of the mastoid. Pain was the chief symptom; there was no aural discharge. He also showed a patient whose maxillary antral cavities were found on operation to be filled with a very thick viscid material, which the pathologist said was probably pure myxoma, though it may have been unusually thick mucin, as Dr. Brown Kelly suggested. Dr. Syme also showed a patient on whom Killian's frontal sinus operation had been carried out. At the operation a very large and diseased fronto-ethmoidal cell was found, extending much further outwards than the floor of the sinus, a condition which, as Dr. Logan Turner remarked, made it impossible that intra-nasal treatment could have been successful. A fortnight after operation tenderness with some cedema showed itself over the left side of the forehead well beyond the limit of the sinus, and the temperature rose to 102.8° with oscillations, and the patient complained of shivering. It was feared that osteomyelitis of the frontal bone was developing. In two days, however, the condition subsided and the patient made an uninterrupted recovery. Dr. Syme also reported a case operated on for *malignant disease of the ethmoid and antrum*, with no recurrence after five years. He also demonstrated, by means of *suspension laryngoscopy*, a case of dislocation of the arytenoid, probably congenital.

Mr. T. K. Dalziel showed a patient on whom he had operated for tubercular glands in the anterior mediastinum causing severe *pressure on the trachea and bronchi*. The sternum was removed, a small portion of the upper part only being left to maintain the shoulder girdle. The base of the heart and the large vessels were exposed and a large tuberculous abscess found beneath the arch of the aorta. Tuberculous material to the amount of about half a pint was removed, to the great relief of the patient, who appeared before to be *in extremis*. Mr. Dalziel referred to two other similar cases on which he had operated with satisfactory results.

Pathological specimens, etc., were shown by Drs. Walker Downie, Connal, and Syme.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

W. T. RITCHIE, M.D., EDWIN MATTHEW, M.D. AND
J. D. COMRIE, M.D.

MAGNESIUM SULPHATE IN THE TREATMENT OF CHOREA.

AFTER the intravenous administration of magnesium chloride had been successfully employed by Calcaterra (1908) in the treatment of two cases of chorea, and after the experimental observations of Meltzer and Auer and of Desquin had demonstrated that magnesium salts depress excitability and conductivity in nerves, Marinesco reported four cases of chorea in which intra-thecal injections of magnesium sulphate effected a cure. It was found, however, that this method of treatment was not unattended with risks. Marinesco's method of treatment was employed by Rocaz with success in one severe case, but that recorded by Bochut and Devic terminated fatally in consequence of acute endocarditis. In the case reported by Caronia (1912) an intra-thecal injection of 8 c.c. of 25 per cent. solution of magnesium sulphate abolished the choreic movements within half an hour, but the patient then became unconscious and marked motor and sensory paralysis ensued. The ill effects passed off in the course of a few days, the patient made a complete recovery, and the chorea did not recur.

Feliziani (*Polislinica*, Sez. prat., 1913, xx. 376) reports three cases treated by means of intra-thecal injections of from 1.5 to 2 c.c. of 25 per cent. magnesium sulphate solution. Two cases were examples of genuine Sydenham's chorea, and both were cured; in the third case there was organic cerebral disease, and the treatment was only partially successful. Feliziani argues that, in view of the failure of other methods of treatment in nearly all cases of chorea, intra-spinal injections of magnesium sulphate alone afford a reasonable, if not certain, hope of speedy cure. Among the ill effects that might follow the injections were the early onset of acute pain, which might radiate from the site of injection into the lower limbs, and severe headache, most pronounced in the temporal regions. One patient became temporarily collapsed, but in no instance did retention of urine or albuminuria, as recorded by other writers, supervene. Most of the ill effects that follow the intra-thecal injection of magnesium sulphate may be avoided if the salt is absolutely pure, if the patient's general nutrition is not impaired, and if he is not suffering from any other disease. The intra-thecal method of treatment should not be employed in cases of chronic chorea: if more than one injection be necessary, several days should

elapse between each injection, and the dose should not exceed 3 c.c. of a 25 per cent. solution.

In eight cases of chorea this method of treatment was adopted with success by Natali (*Rivista osped.*, 1914, iv. 269). The quantity injected at any one time varied from 1.5 to 3 c.c. of from 7-25 per cent. solutions of magnesium sulphate. In mild cases there was uniformly satisfactory improvement soon after the first intra-thecal injection. In some cases the improvement, once begun, was progressive, and ended in complete recovery; whereas in others a second or third injection was requisite in order to bring about relief or cure. Although relapses were infrequent, the author recommends that the injections should be followed by a short course of arsenic. Intra-thecal injections of magnesium sulphate are not indicated in all cases of chorea, and this method of treatment should be reserved for severe cases in which the choreic movements are so intense as to interfere with sleep, and for cases in which other therapeutic measures have failed.

SYPHILIS OF THE CARDIO-VASCULAR SYSTEM.

In introducing this subject for discussion at the 13th National Congress of Internal Medicine in Rome, Bianchi (*Policlinico*, Sez. prat., 1914, xxi. 50) dealt mainly with the pathological and serological aspects of the subject. Syphilitic affections of the heart and vessels are very much more frequent than was supposed a few years ago. The different lesions that might arise were referred to, and attention was drawn to the frequent co-existence of syphilitic aortitis with para-syphilitic lesions of the central nervous system. Early diagnosis was of importance in view of the more favourable prognosis that was justified if specific treatment had been adopted. A positive Wassermann reaction may suggest, but cannot in itself prove, the luetic nature of a cardiac lesion; it is the results obtained by means of specific treatment that prove or disprove the diagnosis. Gnudi drew attention to the fact that 93 per cent. of cases of aneurysm and 73 per cent. of cases with aortic incompetence gave a positive Wassermann reaction. Less frequently the lesions take the form of a gumma of the heart, of a diffuse myocarditis, or of a mediastino-pericarditis. Of 45 cases of secondary syphilis, in which he had made a special examination of the heart, 32 had palpitation, arrhythmia, tachycardia, ventricular dilatation, and lowered blood-pressure. The most reliable evidence of syphilitic aortitis was afforded by pain in the region of the manubrium sterni, by symptoms of coronary disease, by signs of aortic incompetence, and lastly by those of aortic aneurysm. After the first appearance of cardiac failure in syphilitic aortitis the average expectation of life did not exceed two to three years.

Arengeli reported cases in which syphilitic disease of the vessels had resulted from infection fifty years previously. In his experience

the Wassermann reaction was positive in all cases of aneurysm and in 70 per cent. of cases with valvular heart disease. A provocative injection of salvarsan was of aid in diagnosis. He advocated the use of neosalvarsan or salvarsan, the only contra-indication being notable cardiac enfeeblement. Salvarsan might be useful in cases of cardiac asthma or of angina pectoris when theobromine had failed. Ferguson and other speakers also recommended the administration of salvarsan and of large doses of potassium iodide, but Antonelli, Maurizio, and Mingazzini pointed out the risks of salvarsan treatment, and favoured small doses given with caution.

THE CLINICAL SIGNIFICANCE OF ALIMENTARY GALACTOSURIA IN DISEASES OF THE LIVER.

The observations of Hatiegan (*Wien. klin. Woch.*, 1914, xxvii, 335) lend support to the belief that a pronounced alimentary galactosuria is characteristic of catarrhal jaundice. In 41 cases the patient took 40 grammes of galactose before breakfast. The urine was tested every two hours thereafter to determine the time of onset and the degree of the galactosuria. In persons without any sign of disease of the liver no galactose appeared in the urine. In nine cases of catarrhal jaundice the urine uniformly contained more than 2 grammes of galactose. In cases of tumour of the liver there was only a slight degree of galactosuria, or none at all. In malignant obstruction of the common bile duct the excretion of galactose varied from 0.1 to 1.5 grammes; in severe cholangitis, 0.7 gramme; in cholecystitis, 0.4 gramme; and in hepatic cirrhosis, 0 to 2.5 grammes.

According to the writer, alimentary galactosuria is an almost constant manifestation of catarrhal jaundice, and may be of considerable significance in the diagnosis of catarrhal from other forms of jaundice. Moreover, a high degree of alimentary galactosuria was never observed apart from a diffuse affection of the liver such as occurs in catarrhal jaundice. The galactosuria was not accompanied by any febrile reaction such as has been described by other writers.

THE TREATMENT OF TABES, GENERAL PARALYSIS, AND CEREBRAL SYPHILIS.

Bates, Strathy, and M'Vicar (*Canad. Med. Assoc. Journ.*, 1914, iv, 197) report ten cases (six of tabes and four of general paralysis) treated by means of salvarsan or neosalvarsan administered intravenously. All the tabetic patients were benefited—lightning pains usually disappeared or lessened; ocular reflexes became normal in several cases; bladder symptoms disappeared in one case; in all cases the patient's physical well-being, weight, and general appearance were better after treatment. In the four cases of general paralysis the results were less satisfactory, but still encouraging.

The technic of the intralural injection of neosalvarsan is described by Wile (*Journ. Amer. Med. Assoc.*, 1914, lxii. 1165). Following the method of Ravaut (*Ann. de méd.*, 1914, 49), he uses a hypertonic 6 per cent. solution of neosalvarsan in distilled water. The solution is prepared by dissolving 0.3 gramme of neosalvarsan in 5 c.c. of freshly-distilled water. Each drop of this solution contains 3 milligrammes of neosalvarsan, and a dose of from 3 to 12 milligrammes is to be given. The syringe that is employed for the injection is accurately graduated in drops. The patient is placed in position, either lying or sitting, as for a lumbar puncture. The puncture is made with a needle, the end of which fits the graduated syringe. After a few drops of spinal fluid have run out of the cannula the syringe is fitted on to the needle and the fluid is allowed to run into the syringe, thus mixing with the drug. After the mixture has been injected slowly, slight suction is made on the syringe to withdraw a second amount of fluid which washes out the syringe, and this fluid is again injected. The needle is withdrawn, and the patient is placed in the Trendelenburg position for at least one hour, in order to prevent rapid diffusion of the drug towards the upper portion of the cord and the brain.

According to Wile the injections are well tolerated. At most there is a slight amount of neuralgic pain, which passes off in a short time, but as a rule the injections are quite painless. Neuralgic pain is particularly liable to supervene in cases of tabes. Vomiting does not occur. A slight degree of headache, such as accompanies a lumbar puncture, may be complained of.

The intra-spinal injection of salvarsanised serum in general paralysis is discussed by Cutting and Mack (*Journ. Amer. Med. Assoc.*, 1914, lxii. 903). They refer to the fact that salvarsan injected intravenously does not result in the presence of arsenic in the cerebro-spinal fluid. It is therefore necessary to use local therapy in order to attack spirochætes in the cerebral cortex. Swift and Ellis have shown that salvarsanised serum is well tolerated; and the maximum effect of the serum is reached in one hour after the injection of salvarsan, and is increased by heating the serum to 56° C. The writers' cases were given three injections with intervals of two weeks between each. In all cases salvarsan was used in preference to neosalvarsan. There was never any reaction following the intra-spinal injections. From the clinical standpoint the degree of improvement following the injections was somewhat disappointing, but in some instances the patients' mental condition improved. The most striking result was a reduction of the cell-count in the spinal fluid, and the conclusion is drawn that the method of Swift and Ellis is worthy of a thorough trial.

W. T. R.

SURGERY.

UNDER THE CHARGE OF

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SURGERY OF THE BILIARY PASSAGES.

IN reviewing the records of 832 operations on the biliary tract Crile (*Surg. Gyn. and Obstet.*, April 1914, 429) was impressed by the unsatisfactory results in not a few cases where cholecystostomy had been performed for gall-stones with cholecystitis. In such cases a few months after the operation there was a return of the old pain, a rise of temperature, some swelling and tenderness in the scar, which eventually gave way, allowing the escape of some mucus and possibly bile. The formation of such a fistula always gave immediate relief, and after a few weeks it closed, to be followed a few months later by a similar series of events. Cholecystectomy performed in such cases gave permanent relief. The cases in which this "cholecystitis obstruction cycle" developed were those where the mucosa of the gall-bladder had been gangrenous, where a stone had been embedded by ulceration in the cystic duct, where the wall of the gall-bladder had been thickened by scar tissue, and those where no bile was found in the gall-bladder. All these conditions constitute, in Crile's opinion, indications for a primary cholecystectomy.

On the other hand it was found that if the gall-bladder had approximately normal walls, and the cystic duct was patent, then, no matter what was the size or number of the stones, there was no post-operative pathological cycle.

The complete success which should attend the operation of cholecystectomy depends on the technique. Crile frees the gall-bladder from the liver, and only when it is completely mobilised clamps the cystic duct close to the common duct. In one or two cases where the division was made through the neck of the gall-bladder just beyond the cystic duct the portion left subsequently dilated and became the seat of inflammation and actual calculus formation. In cases of acute cholecystitis with omental or other adhesions cholecystectomy is not indicated, as the trauma to the surrounding tissues inseparable from the removal of the gall-bladder in such cases impairs the local immunity and undoubtedly adds to the immediate risk to the patient.

The relatively high mortality associated with operations for removal of stones from the common duct has been a subject of special study by Crile. Death in such cases, he observed, could rarely be attributed to the loss of bile or to infection of the peritoneum, but was due to the gradual development of an asthenic state, characterised by dulness of the mental and motor reactions, a dry tongue, partial suppression of bile, anorexia, and scanty urine—a progressive adynamic state

extremely resistant to any known treatment. From physiological experiments, however, Crile obtained a clue to the explanation of such cases. It was found that the liver performs its functions partly through hormone action and partly through direct innervation. The nerve supply of the liver is derived from the sympathetic system, the nerve fibres passing along the blood-vessels and the common duct. Such visceral nerves are very susceptible to and are readily blocked by slight injuries. It would appear, therefore, that in the course of common duct operations performed by a surgeon who is unaware of this grave danger, the nerve supply to the liver will be more or less blocked traumatically. To obviate this danger the following points are of importance:—free exposure by a long abdominal incision; gentle manipulation and sharp dissection of adhesions, the dissection being rigorously carried along the white bloodless hair line between the peritoneum and the adhesion; exposure of stones by an ample incision through the duct wall so that they may be picked out without injuring the duct mucosa; closure of duct with fine chromic catgut suture, provided that bile drainage through the ampulla or the gall-bladder is assured. Since adopting this technique Crile has seen no case of post-operative disturbance of liver function.

RESECTION OF THE RECTUM FOR CANCER.

For the removal of malignant disease of the rectum situated anywhere above the lower three inches of the bowel C. H. Mayo (*ibid.*, 401) recommends a modified Kraske operation, retaining the normal sphincter. The following points he emphasises as being of importance in securing a satisfactory result:—The abdomen is explored to ascertain the extent of the disease, and if removal be deemed possible a temporary colostomy is made, utilising for this purpose the uppermost part of the pelvic colon. The patient is then placed in the position of abdominal recumbency—lower limbs flexed at hips over the table. The upper part of the rectum is exposed by the trans-sacral route, the peritoneum is opened and the lower part of the pelvic colon pulled down, the edges of the rent in the peritoneum being thereupon sutured to the pelvic colon well above the growth. The portion of gut involved by the tumour is now removed between clamps, at least two and a half inches of the lower end of the rectum being preserved. It is now seen that the upper segment has a considerably smaller lumen than the lower, and this difficulty is got over by making a vertical incision for $1\frac{1}{4}$ inches up the anti-mesenteric aspect of the upper segment and rounding off the angles—thus openings of practically equal calibre are obtained for suturing. In view of the fact that healing is usually defective at the posterior aspect of the anastomosis, the upper segment is rotated through a half circle so that its posterior aspect will be entirely covered by peritoneum. The two ends are now united by a chromic

catgut suture supported by a second row of fine silk sutures. At this stage a few ounces of melted vaseline are poured into the wound, which is then loosely sutured, two rubber tissue drains being inserted, one on either side of the bowel. The anus is then divulsed, and if it shows any tendency to recontract the sphincter muscle is divided anteriorly to permit of thorough drainage from within the gut.

The colostomy opening can be closed as a rule two weeks after the resection of the rectum.

ASCENDING INFECTION OF THE KIDNEYS.

The route by which infection travels from bladder to kidneys is a subject of considerable scientific and practical interest. The frequent occurrence of a spontaneous ascending infection and liability to this complication after anastomosis of the ureters with the bowel are of themselves of sufficient importance to demand an exact knowledge of the pathway of infection. It is, however, of extreme importance in connection with the question of the passage of ureteral catheters in the presence of cystitis and the treatment of inflammatory lesions of the bladder, for if infection travels upwards through the ureteral lumen, then catheterisation of the ureters has obvious dangers, whilst if it be by way of the lymphatics, then ulcerative lesions of the bladder around the ureteral openings demand special and careful treatment.

Sweet and Stewart (*Ibid.*, 460) conclude, from anatomical and pathological, but chiefly from experimental evidence, that ascending infection occurs almost invariably by way of the lymphatics and not through the lumen of the ureter.

By many ingenious experiments they have confirmed the results recorded by Sugimura (*Urob. Arch.*, 1911, xx, 206), and have come to the following conclusions:—

1. That an extensive network of lymph vessels and channels exists in the mucosa and submucosa, in the external coats of the bladder and the ureters, and in the entire structure of the kidney. This network in the ureter anastomoses freely with the lymphatics of the bladder at the one end, and with the lymph apparatus of the kidney at the other end.

2. That an ascending infection travels through this lymphatic system, not through the blood-vessels of the ureter nor through the lumen of the ureter. (a) The blood-vessels can be excluded, because the veins of the bladder and the veins of the ureter, for the greater part, open into the general venous system, not into the venous system of the kidney. (b) The lumen of the ureter can be excluded, because if the lumen be open to infection the infectious process is traceable in the lymphatic system, not along the mucosa of the ureter. If the lumen be closed to infection the process extends to the kidney in the usual way. If the lumen be open to infection, but the lymphatics not

in contact with virulent infection, as when the ureter is passed through the pancreatic duct, there is no ascending infection; if the lumen be open, but the continuity of the lymphatics be interrupted, infection does not ascend: and finally, if the kidney pelvis be directly connected with the gut, the general infection, characteristic of an ascending infection of the kidney, does not occur.

From the point of view of the practical surgeon it would seem that these results would be of service in the consideration of the possibilities of any infectious process involving the lower genito-urinary tract or the pelvic organs in general: certainly the cystoscopist must transfer his attention from the general question of cystitis to the particular one of the local lesions caused by the cystitis, their extent and location. The possibility of the effective local treatment of ulcerative processes of the bladder is also suggested.

The results of this work upon the general question of the anastomosis of the ureters with the bowel would not seem to hold out much promise. In their hands, at least, every attempt thus far has been blocked by the ease and rapidity with which the infection enters the lymphatic system of the ureter.

GONORRHOEAL ARTHRITIS.

Walther (*Boston Med. and Surg. Journ.*, 9th April 1914, 561), in a survey of the recent literature on this subject, records some interesting statistics with regard to the incidence of metastatic arthritic lesions in cases of gonorrhoea, and discusses the methods of treatment employed in various clinics. In 30 per cent. of cases one joint only was involved, in the remaining 70 per cent. the infection was polyarticular. The knee-joint was involved twice as frequently as any other joint, the ankle-joint being second in order of frequency.

Whilst the vast majority of arthritic metastases occurred in long-standing cases of gonorrhoea and as the result of some local retention of infection in one or other of the peri-urethral glands, a slight trauma being the ultimate determining factor, in a few cases the arthritis set in during the early acute stage of the urethral infection.

All authorities are agreed as to the primary importance of local treatment of the urethral condition when joint manifestations have set in, massage of the prostate and seminal vesicles being strongly recommended from many of the continental clinics.

The value of Bier's passive hyperemia in relieving the pain of joint lesion is attested to by many. Aspiration of the fluid within the inflamed joint and injection of some antiseptic fluid is a method with many warm advocates. Murphy uses a 2 per cent. dilution of formalin in glycerine, injecting from 5 to 20 c.c. of this solution according to the size of the joint and the amount of fluid aspirated. Excellent results have been reported by those who have used this method extensively.

Hildebrand and Roux claim equally good results from the injection of from one to three drachms of the tincture of iodine after aspiration.

Opinion as to the value of gonococcal vaccines in cases of arthritis is on the whole favourable, the best results having followed the use of a mixed (polyvalent) vaccine.

Fuller believes that gonococcal arthritis is the clinical manifestation of infection of the seminal vesicles by the gonococcus and consequently that treatment must be directed to the latter. In 122 cases of such metastatic arthritis he has removed one or both vesicles with excellent results and with no fatality. So far, however, few surgeons have adopted this radical mode of treatment, which in unskilled hands cannot but be fraught with considerable risk.

D. P. D. W.

OBSTETRICS AND GYNECOLOGY.

UNDER THE CHARGE OF

A. H. F. BARBOUR, M.D., AND J. W. BALLANTYNE, M.D.

THE PATHOLOGY OF PREGNANCY.

The Pelvic Kidney in Pregnancy.—The complications of pregnancy seem to be almost without number, and the surprises which meet the laparotomist seem likewise to be beyond counting. Ferroni (*Ann. di ostet. e ginec.*, vol. i. for 1914, p. 169) records a case which exemplifies both these statements in a striking fashion. The patient had had seven pregnancies at full term, one of which was twins, and two abortions; and the seven gestations had all ended in normal labours and puerperia. The second last pregnancy had been accompanied by grave albuminuria and anemia, and the last one had been brought to an end by Ferroni at the third month because of excessive albuminuria and intractable vomiting. After the abortion thus artificially induced the symptoms improved to some extent, but a month later the woman returned suffering from metrorrhagia and pain in the lower part of the abdomen (especially to the left side). In the position of the left ovary was an elastic tender swelling, very slightly movable, about the size of a fist. This swelling had not been noticed when the induction of abortion was performed. There was no fever. A cautious curettage was followed by cessation of the metrorrhagia and a return of normal menstruation, but the swelling, regarded as ovarian, remained unaffected, and two months later it was found to be larger, whilst the uterus was normal. The abdomen was then opened, and Ferroni found, to his surprise, the internal genitals quite normal; the tumour was the left kidney fixed in a state of congenital displacement in the pelvis, and showing torsion of its pedicle (one turn). The peritoneum was divided and the kidney was enucleated; part of each Fallopian tube was excised. The kidney was malformed (bilobate), and its artery

came from the external iliac. Several interesting questions are raised by this case. The error in diagnosis was quite explicable by the unusual situation of the kidney, but the possibility of such a renal dislocation must in future be kept in mind by the gynecologist. Another matter of note was the fact that although the kidney must have been out of place all the woman's life, there had been seven perfectly normal pregnancies and labours: in the last two gestations, however, there had been symptoms of toxæmia. It was probable that in these two pregnant periods the torsion of the kidney had been present; possibly it had disappeared after the first one but remained persistent after the last. Ferroni justified the performance of double salpingectomy by the fact that the woman was being left with one kidney: since, also, she had suffered previously from albuminuria, and since it was not wise to put the increased strain of pregnancy on the solitary kidney, it was better to prevent the possibility of future gestations, especially as she had had seven at term already.

The Corpus Luteum and Tubal Pregnancy.—Fraenkel, Opitz, and others have drawn attention to the concomitance of a cystic state of the corpus luteum and tubal pregnancy, and Dr. Louis Schil (*Arch. mens. d'obstét. et de gynec.*, ann. iii. p. 179, 1914) considers the matter in more detail and with fresh material. He has examined a series of six cases of tubal pregnancy operated on by Professor Bar in which either the pregnant tube and the corresponding ovary or all the genital organs were available for investigation. In four of these cases the corpora lutea had cystic cavities, and in the other two (in which the operation was unilateral) the ovaries were microcystic, sclerotic, and showed no trace of a developing corpus luteum. It seems fair to suppose that the pathological state of the corpus luteum may have some causal effect in producing the tubal pregnancy. Dr. Schil proceeds carefully to examine the four specimens referred to, which were all of them instances of ruptured tubal gestation, and he gives in detail the histological appearances of the large cystic corpus luteum in each. It is pointed out that in normal circumstances by the time the impregnated ovum has reached the uterine cavity and is about to fix itself there, every trace of a central cavity in the corpus luteum from which it has come has disappeared: the persistence of a central cavity in the corpus at this stage is pathological, and constitutes one of the forms of cyst of the corpus luteum (not, however, the variety known as a lutein cyst). Dr. Schil further points out that it has been shown that the internal secretion of the corpus luteum plays an important part in the migration and nidation of the impregnated ovum. When the dehiscence of the Graafian follicle is taking place the epithelial lining of the Fallopian tube loses its cilia: it is very probable, therefore, that the progress of the ovum towards the uterine cavity is due to the peristaltic contractions of the musculature of the tube. If, now, the evolu-

tion of the corpus luteum is abnormal), it is more than likely that the phenomena of migration and nidation of the ovum, which are so precise and delicate in their nature, will be disturbed, and amongst these phenomena is the peristaltic action of the tube. The following conclusions, therefore, Dr. Schil thinks, may be drawn:—In the first place, the mechanism of the production of tubal pregnancy resides in the suppression of the peristaltic contractions of the musculature of the tube during the migration of the ovum through it. In the second place, that which decides the stoppage of the tubal peristalsis is also the determining factor in the production of the tubal pregnancy. Since the corpus luteum in normal conditions controls the peristaltic contractions of the tubes, the pathological factors capable of suspending these contractions may be either, first, any one of all the affections of the corpus luteum (including its cystic state) which can modify its physiological activity, or, second, any one of all the extra-ovarian factors which may inhibit the action of the internal secretion of the corpus luteum. It will be seen that this hypothesis of the origin of ectopic pregnancy still leaves open a number of ways in which the abnormality may be produced; but it will be interesting to find whether other observers report cystic conditions of the corpus luteum in a sufficient percentage of the cases of tubal gestation to make it probable that there is a causal nexus between the two states.

Extra-Uterine Pregnancy with Triplets.—The time has long passed since twin ectopic gestations were pathological curiosities, but ectopic triplet pregnancies are still uncommon enough to deserve notice. Dr. Z. Diamant (*Zentralbl. f. Gynäk.*, Bd. xxxviii. S. 128, 1914) adds a fourth to the three already reported instances of this reproductive rarity. The first was Säger's patient, who had one foetus in the ampulla of the tube and two others in an interstitial gestation sac; the second was Wilmer Krusen's case of triplets in the ampulla of one tube; and the third was that reported by Launay and Seguinot, in which there were twins in one tube and a third foetus in the other. Diamant's patient was 34 years of age and a working woman; he first saw her towards the end of April 1913, and found that her last period had been in the end of February. Since then she had been bleeding for a fortnight, and was suffering from headache, faintness, and pains in the lower part of the abdomen. She had had one normal labour and no abortions. The bimanual examination revealed an enlarged, soft, anteflexed uterus with a slight inclination towards the left; at its right side was a swelling of the consistence of dough, not clearly defined, and of the size of the fist, which projected into the pouch of Douglas, where two other swellings as large as walnuts were lying near to it. There was slight bleeding going on. An extra-uterine pregnancy was diagnosed, and laparotomy was performed. In the lower part of the abdomen there was much clot and fluid blood. The

uterus, as large as the hand, was soft and hyperæmic, had no adhesions in front, but was attached behind to a mass of clot. Blood-clot filled the whole pouch of Douglas as well as the right half of the pelvis: the annexa on the left side lay amongst old adhesions. The right tube, whose ampulla was much distended, passed directly into the mass of clot already referred to. After separating and raising up the whole tumour a tubal abortion of the right tube with the escape of three fetuses (about 3 cms. in length) into the pouch of Douglas was made out. The right tube, with the neighbouring part of the uterine cornu, was excised, and the corresponding ovary was also taken away. The abdomen was cleansed of clot and the incision closed in layers. The woman made a complete recovery. This case must therefore be classified as a triplet ectopic pregnancy which ended in tubal abortion, and was successfully operated upon.

Cholecystitis in Pregnancy.—When it is borne in mind that biliary lithiasis is common in pregnancy and the lactation period, that infection with the bacillus coli is often met with in the puerperium, that cholesterine plays a large part in the formation of biliary calculi, and that cholesterinæmia is the rule in the pregnant woman, it is somewhat surprising, writes Professor Audebert (*Ann. de gynec. et d'obstét.*, 2nd ser., vol. xi. p. 18, 1914), that cholecystitis or inflammation of the gall-bladder is comparatively rare in connection with child-bearing. His house-physician, Dr. Laurentie, has only succeeded in bringing together 43 cases out of medical literature, and of these only 18 were in pregnancy. The case which Professor Audebert relates in detail is therefore of considerable interest. The patient was 28 years old when married; she had a miscarriage a year later, followed by the birth of a still-born child (breech presentation) the next year, and then three years later by a living male infant who had survived. Each pregnancy had been accompanied by a considerable amount of sickness, and there had been some tearing of the perineum and endometritis necessitating curettage and colpo-perineorrhaphy. The patient became pregnant again in September 1912; vomiting soon appeared, with colourless stools and slight jaundice, for which calomel and Vichy water were given. During January 1913 the vomiting became more frequent and then incessant; there was some fever and a cough; then abdominal pain began, which gradually came to be localised in the hepatic region, and especially over the gall-bladder. The treatment was purely medical, and consisted in the application of ice and a very rigorous diet. On the 14th January a great quantity of mucus and bile was passed, but no gall-stones were seen although looked for. Improvement then set in, the vomiting lessened, and the temperature fell. Then suddenly on the 19th a very rare complication occurred—intestinal hæmorrhage began and lasted for more than an hour, first black and then bright red blood coming away, followed by a tendency to

syncope and a thready pulse. Hypodermic injections of caffeine were given, but had to be stopped, for each prick became the centre of a large area of subcutaneous ecchymosis. A second attack occurred some hours later, but thereafter the convalescence was unbroken, although the pulse remained at 120 for 15 or 20 days. The rest of the pregnancy pursued a normal course, the birth was natural, and the child living, normal, and healthy. It remains to be noted that the patient's mother had a sharp attack of inflammation of the gall-bladder about the same time that her daughter became pregnant, and Professor Andebert therefore regards the case as one of family cholæmia. It is somewhat remarkable that the gall-bladder infection had no effect upon the pregnant uterus or upon the fœtus, although the evening temperature was very high for five days (above 39° C.). With regard to the intestinal hæmorrhage, which the writer terms "a peculiarly dramatic episode," it has to be noted that the patient had never shown any signs of hæmophilia: indeed its causation is left dark, and it is to be regretted that there was no examination of the blood. The case, however, is of considerable interest, and its happy ending under so simple a treatment is very satisfactory and almost surprising.

J. W. B.

LARYNGOLOGY, OTOTOLOGY, AND RHINOLOGY.

UNDER THE CHARGE OF

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OTOLOGY IN RELATION TO INFECTIOUS FEVERS, PUBLIC HEALTH, AND EDUCATION.

THE severer forms of deafness (congenital and acquired) which lead to deafmutism have already been dealt with in a previous paper (*Edin. Med. Journ.*, September 1911). For this reason the present abstract is mainly concerned with I. Ear disease in relation to public health institutions, such as fever hospitals; and II. The diagnosis and treatment of deafness and otorrhœa among children at the public elementary schools.

I. *Infectious Fevers*.—Goodall (*Report XVII., Internat. Med. Congr.*, London, 1913) points out that in most infectious fevers the primary lesion is in the fauces and nasal passages, and that neighbouring cavities, such as the Eustachian tube and other parts of the middle ear cleft, are affected by direct extension. The middle ear disease varies with the severity of the faucial and nasal infection. In scarlet fever the lesion is in the fauces and often also in the nose. Scarlatinal otitis occurs in from 5 to 15 per cent. of cases, usually in about 12 per cent. In measles pronounced faucial and nasal lesions are not uncommon, and severe ulceration of the fauces and pharynx may occur during the stage of

convalescence. Otitis media is present in from 9 to 13 per cent. of measles cases. In whooping-cough nasal catarrh gives rise to otitis in about 5 per cent. of cases. In enteric fever tonsillitis may occur early, and later on there may be pharyngeal ulceration: otitis is found in from 2 to 6.6 per cent. of patients. In influenza muco-purulent nasal catarrh and tonsillitis give rise to middle ear inflammations, and diphtheria is frequently associated with a similar condition. (Goodall remarks that scarlatina, measles, and pertussis are responsible for many cases of adenoids and chronic tonsillitis.)

There is a remarkable absence of pain in cases of suppurative otitis media due to infectious fevers, though the aural complication is sometimes accompanied by a rise of temperature. The discharge is at first clear and non-purulent, but later on pus appears in most cases. Rarely patients have abortive attacks in which discharge does not occur. (From the point of view of the subsequent hearing of the patient, these attacks are by no means the least dangerous, as they may be followed by chronic adhesive processes, or even by otosclerosis.—Abs.) Goodall states that facial paralysis may occur in purulent cases, but that it usually clears up. Even after the otorrhœa has healed the hearing is sometimes very bad, especially in cases complicated by labyrinthitis, but Goodall believes that the degree of deafness is rarely severe enough to lead to deafmutism. In cerebro-spinal meningitis, on the other hand, in which the labyrinth is involved from the meningeal side, C. B. Ker found that 16 out of 152 cases became permanently deaf (quoted by Goodall).

As regards *treatment (a) of the nose and fauces*, Goodall points out that gargling, spraying, douching, and swabbing may be employed. He recommends swabbing of the fauces with perchloride (1-2000) or medicinal izar (pure or diluted). Goodall is doubtful about the supposed dangers of douching the nose, and recommends an alkaline or boracic lotion. (*b) Treatment of the Ears.*—On account of the absence of earache, it is very difficult to ascertain the early stages of otitis unless a daily examination of the tympanic membranes is carried out. In Goodall's opinion, paracentesis is rarely called for, but after discharge has occurred the ears should be gently syringed every three or four hours with boric lotion or carbolic (1-80). Thereafter the meatus is dried with sterile wool mops, a piece of gauze inserted, and a dressing applied.

Results.—Out of 303 cases of scarlet fever discharged in January and February 1913 only one had otorrhœa present on dismissal; of 421 measles cases only 8 had persistent otorrhœa, while in only 1 out of 90 pertussis patients was discharge present when the patient left hospital. From statistics collected in the hospitals of the Metropolitan Asylums Board it was found that between 1900 and 1909 153,607 cases of scarlet fever had been treated. Of these 20,349 (13.1 per cent.) had otitis media; 920 (4.5 per cent. of 20,349) had mastoiditis or

disease of the temporal bone *during their stay in hospital*. Cases with persistent discharge were kept in hospital for 12 weeks, and then sent out with a recommendation to apply to a doctor or hospital. Goodall states that C. B. Ker of Edinburgh had only found operation necessary in one out of 1800 scarlatina cases treated in 1908. Goodall does *not* believe in the advisability of a mastoid operation if the discharge persists after six weeks' treatment. He states that opinions vary as to the efficacy of vaccine treatment in persistent rhinorrhœa and otorrhœa, but believes that autogenous vaccines are best. Operation on enlarged tonsils and adenoids should not be performed during the acute stage of infectious fevers, but delayed for eight weeks. As regards *freedom from infection*, Goodall thinks it possible that the virus of the disease may be present in the air passages and ear after the acute stage of scarlet fever, influenza, diphtheria, erysipelas, and cerebro-spinal meningitis. The evidence is strongest with regard to scarlet fever (4 per cent.) of the recovered cases. (Newsholme states that the dangerous carrier cases are convalescents with persistent aural and nasal discharge.) No method of treatment is certain to free patients from infection, though douching, swabbing, sera, and vaccines may be tried. Delsaux (Brussels), who opened the discussion along with Goodall, stated that there were two varieties of ear affection in infectious fevers—(1) otitis media following tonsillitis and rhinitis, and (2) inner ear affections due to toxins. With regard to treatment—(1) Otorrhœa may be dealt with by (*a*) the wet method already described, or (*b*) by the dry method—gauze drainage without syringing. The choice of method depends on the amount of discharge. The mastoid process should be tested daily for tenderness, and the mastoid opened whenever this is found. (2) Delsaux pointed out that the auditory nervous apparatus is very sensitive to toxins, and that toxic neuritis should be treated by diluents, purgatives, and sudorifics.

In the subsequent discussion Cheatele stated that he was opposed to the use of irritating antiseptics and fluids of any sort in scarlatina; hot soothing vapour should alone be used, and the nose should not be violently blown. If the ear becomes infected, early free incision of the tympanic membrane should be performed. If the mastoid antrum is involved, the course of the case depends on the type of mastoid process present as determined by the X-rays. If the process be cellular, early operation is necessary; whereas if the bone be of the diploetic infantile type, drainage through the perforation in the drumhead may result in cure. It is in these latter cases, however, that intracranial or labyrinthine complications are so often seen, especially if the case becomes chronic with caries of the ossicles and cholesteatoma formation. Cheatele holds that acute cases do not become chronic if treated by otologists. At the present time hundreds of cases leave fever hospitals with chronic aural discharge in which the mastoid operation should have been per-

formed and the discharge cured before dismissal. Bronner (Bradford) advised the use of an oily solution containing menthol, applied by means of a de Vilbiss nasal spray, in rhinitis due to infectious disease. Sydney Scott and Dan M'Kenzie (London) advocated daily inspection of the ears, early paracentesis when otitis is present, and mastoid operation in any doubtful case. M'Kenzie considered hydrogen peroxide the best solution for spraying the throat. Koenig (Paris) sprays both nostrils, first with a weak cocaine solution and then with a tepid alkaline lotion. The patient gently blows out the liquid, and finally a powder of dry lactic acid bacilli is insufflated. Dundas Grant (London) does not approve of the use of cocaine in the nose in fever cases, but favours the routine introduction of carbolised glycerine drops into the external auditory meatus. He believes that the radical mastoid operation may be called for if simple antrotomy fails, but does not agree with Knivett Gordon, who some years ago recommended the radical operation in the first place in cases of persistent scarlatinal otorrhoea. Douglas Harmer believes that sensitised streptococcal vaccines may effect a cure in some acute septic cases. Watson Williams (Bristol) favours protargol as a nasal spray. Mygind (Copenhagen) did not agree with Goodall that patients left fever hospitals with their ears cured, or at least in such a condition that surgical treatment later on was unnecessary. Mygind had seen many fatalities due to intracranial complications following neglected scarlatinal otitis. Thousands of lives were lost all over the world from neglect of suitable operative treatment in fever hospitals. In conclusion, the following resolution was unanimously carried by the otological and laryngological sections of the Congress:—"It would be greatly to the advantage of the community if experts in otology and laryngology were attached to the special hospitals for the treatment of epidemic diseases."

II. *Deafness and Otorrhoea in the Public Elementary Schools.*—M'Leod Yearsley (*Public Health*, April 1909) points out that mental dulness in children is often more apparent than real, the true cause being deafness. A normal child should hear the forced whisper in a quiet room at from 22 to 27 yards. The ear under examination should be directed towards the doctor, while the other ear and the eyes of the child should be closed by the teacher. (The abstractor is of opinion that two teachers could, with a little training, carry out this examination in an efficient manner.) Yearsley divides cases of deafness into three groups—(1) slight deafness (whisper heard at 4 yards or more); (2) medium deafness (whisper at 2 to 4 yards); (3) marked deafness (whisper below 2 yards). All cases found to be even slightly deaf should be examined by an otologist. Children in group (1) can be taught in the ordinary classes if they are placed in a front seat and get special attention; group (2) should be taught in special classes in the elementary schools; while group (3) should be placed under a teacher

who is qualified as a teacher of the deaf. In London they have ten schools for the deaf, and the London County Council is considering the question of a school for the semi-deaf.

Statistics Regarding Deafness and Otorrhoea in School Children.—Frey (*Zeitschr. f. Kinderschutz.*, Jahrg. iv. Nos. 8 and 9) states that Bezold, Denker, and Nadoleczny in Germany, and Björn and Daac in Scandinavia, have all found from 25 to 50 per cent. of school children with defects of hearing. Frey himself found 12·3 per cent. in Vienna. Almost all cases are due to nasal or pharyngeal disease: and Frey states that if adenoids and nasal catarrhs were attended to at the proper time there would be a great diminution in the cases of deafness. He found changes in the post nasal space in 55 per cent. of all children examined. (This does not mean that operation is called for in every case.—Abs.) Kerr (*London C. C. Med. Officer's Report*, 1909) states that at Bradford there is 6 per cent. of deafness in school children, in South London 12 per cent., while in East London the percentage is 30. Yearsley (*Brit. Journ. of Child. Dis.*, September 1906) reports that von Ruckard, Weill, Gelle, and Bezold have found about 22 per cent. of German school children more or less deaf. In England Cheatle, Murray, and Permewan found about 50 per cent. more or less deaf, though in many cases the defect was so slight that no one noticed it. As a rule it is among children at the tail of the class that deficient hearing occurs. Yearsley believes that the prolonged fatigue of trying to hear and the resulting strain are bad for children. Parents who apply to their doctors for advice are too often told that the child will "grow out of" its ear trouble.

Otorrhoea.—In a letter to the abstractor Yearsley states that in the slum quarters of London cases of otorrhoea are very appreciably higher than in the better districts. From the examination of a large number of children he gives the following figures regarding otorrhoea:—Boys 1·4 per cent., girls 1·5 per cent., infants 1·65 per cent. In East London Miss Ivens examined 1000 children and found otorrhoea in 15 per cent. of the mouth breathers and in only 2·8 per cent. of the others. Dr. Kerr Love has informed the abstractor that in Glasgow there are about 120,000 school children, and that among them there are 3000 cases of ear disease: about 1500 of these are cases of suppurative otitis media. In Edinburgh we have almost 40,000 children in the public elementary schools, and on looking over the case records at the Ear and Throat Department of the Royal Infirmary for the last seven years it appears that 447 Edinburgh children of school age (5 to 13) were treated for otorrhoea. It is quite true that many of these belonged to a wealthier class than that which attends the board schools, but even allowing for this, it is probable that, if we remember the cases that attend other aural clinics or do not come to hospital at all,

the number of school children suffering from otorrhœa amounts to about 600.

The *mortality* of suppurative otitis media varies according to the stage and type of disease present—acute or chronic, tubo-tympanic or antro-tympanic, complicated by cholesteatoma or otherwise. If statistics be obtained from the aural department of a general hospital, to which intracranial cases as well as those of simple otorrhœa are sent, it will probably be found that the mortality of the mastoid and intracranial operations (acute and chronic) is about 10 per cent. On the other hand, if cases are specially chosen for a certain operation—such as the modified radical mastoid—it is not very difficult to get a mortality as low as 1 per cent., or even less. Statistics obtained from Berlin some years ago showed that 0·6 per cent. of all hospital deaths were due to the results of suppurative otitis media. At the Royal Infirmary there are about 800 deaths every year, and of these from 8 to 16 are due to the intracranial complications of middle ear suppuration. Tubercular otitis media is common in infants fed on unsterilised cow's milk, but this disease usually kills the child before it reaches school age.

III. *Organisation of Medical Treatment of School Children.*—Yearsley (*School Hygiene*, May 1912) states that cases of chronic otorrhœa are nuisances as out-patients, and do not pay the private doctor; they require systematic attention. In the abstractor's experience even a visiting nurse is not satisfactory, as she does not always possess the skill and experience necessary to syringe a child's ears efficiently. Further, she soon gets tired of such cases, and hands over treatment to the mother, who may have six other children to attend to, and, in any case, has not the time or skill, and very often not even the money, to undertake proper treatment. For these reasons cases of chronic otorrhœa are peculiarly suitable for treatment at school clinics, where they can be regularly attended to under the supervision of young specialists. Yearsley believes that a large majority of cases are curable; and Kerr Love reports that more than 50 per cent. of cures are obtained in Glasgow. For the last year the abstractor has had treatment of school children sent to him by the (Leith) school medical officer carried out on the following lines:—The child comes at 8.30 A.M. to the hospital and is placed on its side with the affected ear uppermost. Peroxide of hydrogen drops are first instilled and left in the ear for five minutes. The ear is then syringed with lukewarm lysol solution (5ss to the pint). The meatus is next dried with sterile wool mops, and then spirit and boric acid drops (12 grs. to ʒi) are instilled and left in the ear for 10 minutes. Finally, a strip of sterile selvedge gauze is inserted into the meatus and the child sent to school. At 3.30 P.M. similar treatment is carried out at the Leith school clinic. In this way 50 per cent. of cures have so far been obtained, even in chronic cases. Yearsley recommends the following solutions for syringing:—Saturated lukewarm solution of

boric acid, perchloride of mercury (1:2000), carbolic (1:80), chinosol (1:1000), formalin (1:2000). He uses the following instillations:—Perchloride of mercury ($\frac{1}{2}$ gr. to $\frac{5}{1}$ of spirit), zinc sulphate (6 grs. to $\frac{5}{1}$), dry powdered boric acid insufflation. Yearsley states that most cases are cured in 2 to 6 weeks. If treatment fails in 3 months, operation is probably necessary. Vaccines may do good, but Yearsley has found them disappointing. Recently ionic medication has been employed in the treatment of chronic otorrhea with good results. Attention to the child's general health is very important, and Yearsley recommends the iodide of iron, hypophosphites and cod liver oil, in addition to fresh air, good food, and breathing exercises. Cases in which treatment fails have bone disease, granulations or polypi, cholesteatoma, labyrinth trouble, etc.

Dr. Kerr Love writes:—"Treatment under the Glasgow School Board has been going on for nearly two years. In all, about 2000 cases have been treated, and 7 nurses are continuously engaged in the management of these cases. I see all cases once, and put them under treatment, and in cases of middle ear suppuration I see all at least twice—the second examination to ascertain that recovery is taking place and to dismiss the patient or make some alteration in treatment. Treatment by me is carried out at four clinics, and the children from the 80 or 90 schools of Glasgow are gathered to these clinics. The treatment of middle ear suppuration has been much more satisfactory than in hospital practice, for two reasons—(1) it is always carried out by a trained nurse and never left to the parent; and (2) the child's absence from school is very short, because the twenty-five clinics are arranged in convenient centres for groups of three or four schools. The mother, therefore, has not to leave her domestic duties to bring the child to a hospital, where long waiting is usually necessary. . . . Tonsil and adenoid cases are sent to the hospitals for operation, but it is probable that next year the School Board will arrange that these operations be done under the care of the Board. *I think this school work is perhaps the most satisfactory aural work I have ever been engaged in.* (Italics abstractor's.). . . . I am sorry to say that scarlet fever and measles cases are dismissed from our fever hospitals before ear discharge has ceased, and I have sometimes to exclude such children from school. . . ."

Dr. Buchan, M.O.H. for Bradford, writes that last year the Bradford City Council (the education authority in England) appointed a surgeon for diseases of the throat, ear, and nose occurring in school children. McLeod Yearsley writes that he thinks the best method of treatment is the establishment of school clinics, with departments for diseases of the ear, nose, and throat under young specialists. The children from the neighbouring schools should go to the school clinics for treatment. Only serious cases and those in which conservative

treatment has failed should be sent to hospital. Yearsley has had the following notice inserted in the *L. C. C. Gazette*:—

DISCHARGING EARS.

There are in the schools certain children suffering from discharging ears who are *not under medical treatment*. The condition is one that not only affects the general health and future prospects of the child who is suffering, but is a constant menace to life.

Head teachers and school nurses should therefore report at once all cases of discharging ears, *not already under treatment*, directly to the divisional medical officer at the local office of the Public Health Department.

School nurses and cleansing nurses are, in addition, asked to make special efforts in the course of their routine examinations to secure that no cases of discharging ears pass unnoticed.

The addresses of the local offices of the Public Health Department, showing the electoral areas dealt with by each division, are as under.

(Here follow the addresses of the local offices of the Public Health Department.)

In conclusion, one cannot help thinking that if ear disease were treated at fever hospitals and school clinics on the lines suggested in this abstract, much unnecessary deafness, not only in children but also in adults, would be avoided, and the large mortality due to the intracranial complications of middle ear suppuration greatly reduced.

J. S. F.

PATHOLOGY.

UNDER THE CHARGE OF

THEODORE SHENNAN, M.D., AND JAMES MILLER, M.D.

THE NATURE AND SIGNIFICANCE OF PERITONEAL NEOPLASMS.

THE tumours arising from the lining membrane of the peritoneum may be classified into four groups:—(1) Those which have the appearance of tumours but which are in reality of inflammatory origin. (2) Secondary growths due to bursting of tumours of the ovary or other viscous into the peritoneal cavity and the implantation of the tumour cells on the serous surface. (3) Tumours arising from the lining cells of the cavity—true primary growths. (4) Tumours arising from the lymph vessels lying under the lining endothelium.

Growths belonging to the first category are only very occasionally met with. Such a one is described by Walz (*Arbeit. a. d. Geb. d. path. Anat., etc., a. d. path-anat. Inst. z. Tübingen*, Bd. ix. H. 1, S. 1). The case was that of an infant which died ten minutes after birth, in whose peritoneal cavity were found masses of colloid material resembling a hydatid mole of the uterus in appearance. On microscopic

examination of the material it was found to consist of homogeneous structureless masses surrounded by granulation tissue. The homogeneous material was regarded as meconium which had escaped from a ruptured portion of intestine. Being non-organismal and only slightly irritant the reaction set up was of a chronic type.

A similar process is described in some cases of so-called pseudomyxoma peritonei following the bursting of a simple cystic tumour of the ovary (Goldschmid, *ibid.*, p. 175). In this paper several cases of the kind are described in which numerous nodules are found scattered through the peritoneal cavity. On microscopic examination these are found to consist of portions of tumour tissue enclosed in masses of cells formed by a proliferation of the lining endothelial elements. Subsequently the tumour cells undergo involution and necrosis and the implantation grows no further.

To the second category belong those cases of tumours of the ovary which burst into the peritoneal cavity and whose cell elements have the property of independent growth. These cell elements thus produce throughout the serous sac secondary tumours of a papillomatous or adenomatous character. Even these, according to Goldschmid, are not necessarily malignant tumours in the ordinary sense of the term. In some instances, however, such implanted tumours are malignant; they may arise from the ovary or from some bowel carcinoma.

The tumours of the third and fourth groups may be classified together as primary neoplasms of the peritoneum. Those which arise, or are believed to arise, from the lining cells are peculiarly interesting, as their nature is not at all clear. Herzog (*Beitrage z. path. Anat. u. z. allg. Path.*, Bd. lviii. H. 2, S. 390) gives details of a case illustrating this type of tumour. The patient was a male, *æt.* 51, who was admitted to hospital suffering from indigestion and exhibiting considerable emaciation. The abdomen was prominent, and on opening it some blood-stained fluid was removed. When this had been done there were found scattered throughout the cavity immense numbers of small nodules. The coils of intestine were matted together but could be separated from one another fairly easily. Each coil was covered with tumour masses, soft, and of a grey or yellow appearance. The stomach and parietal peritoneum were similarly covered, and the omentum was infiltrated with growth, shrunken and drawn up. The liver and spleen were covered with similar nodules, and were also adherent to their surroundings.

On microscopic examination the soft masses of tumour were found to consist of epithelial-like cells arranged in an alveolar fashion and with a sparsely-developed scaffolding of fibrous tissue. The cells were cylindrical or polygonal and relatively large. They possessed large nuclei with a wide-meshed chromatin network. There was a certain amount of invasion of the subjacent portions of the peritoneum, but

the tumour was wonderfully limited, and there were no growths in any organ or other part of the body.

Herzog regards this tumour as undoubtedly a primary growth arising from the lining cells of the peritoneal cavity. In the younger portions of the tumour the cells resembled very closely those lining the cavity—in fact the formation of the tumour by the building first of cell columns and then of alveolar spaces could be observed.

This tumour bears a strong resemblance to one described by Miller and Wynn (*Journ. Path. and Bact.*, 1908, vol. xii. p. 267). In this case the peritoneal cavity was studded with soft gelatinous nodules, and in addition there was a mucoid ascitic fluid. Microscopically, the tumour consisted of large rounded cells with a small amount of connective-tissue stroma. In places an alveolar arrangement of the cells could be made out. There was no question of the origin of the cell accumulations, as all stages, from merely swollen endothelial cells to the large tumour masses, could be made out.

A number of similar tumours have been described by Guttman, Benda, etc., both in the peritoneal and pleural cavities. The question of their exact nature is a most interesting one, and is intimately bound up with the question of the nature and origin of the lining cells of the pleural and peritoneal cavities.

The pleuro-peritoneal cavity arises by a splitting of the mesoderm. The lining cell elements are mesenchyme cells, which are at first columnar or cubical and only later on become flattened. The development is said by Marchand to be entirely different from the development of the lymph spaces and vessels lying subjacent to the endothelial lining. Most German authorities, such as Benda and Marchand and following them Herzog, regard the cells as epithelial in nature and the primary growths therefore as carcinomata. Marchand bases his view largely upon the behaviour of the lining cells in inflammatory conditions. According to him they bear a relatively passive part in the reaction to an irritant. They are capable of proliferating and covering in a foreign body and covering over a denuded surface, but they do not take an active part otherwise. This he regards as being in conformity with their epithelial nature. Herxheimer and Benda adopt a similar view. The view does not, however, receive general acceptance. Experimental observers in this country, such as Beattie, Miller, etc., regard the lining cells of the peritoneum as capable of active proliferation under the action of an irritant. The younger cells thus formed are effective phagocytes, and in tuberculous conditions take part in the formation of tubercle nodules. The tendency of these observers is, in short, to regard the endothelial cell of the peritoneum as very much of the same nature as endothelial cells lining lymph and blood vessels—as a modified connective-tissue cell.

Adopting this view, one would be inclined to classify *a priori* primary

neoplasms of the lining cells of the peritoneum as sarcomata or endotheliomata. In the view of the author this idea is borne out by the microscopic appearances of such tumours, at any rate in some cases. A similar view is held by Körner. This idea is in conformity with the development of the cells. They arise, as has been said, from the mesoderm. They become modified by forming a lining to a serous sac, but on proliferating under the stimulus of an irritant or of tumour formation it is reasonable to assume that they may become less specialised and revert to the more primitive connective-tissue type.

As already stated, authorities place in a category by themselves the tumours which arise from the lymph vessels of the peritoneum, *i.e.* those subjacent to the lining cells. Such tumours are regarded by all observers as endotheliomata. They show the characters of lymphangio-endotheliomata elsewhere. They have a greater tendency to invade the subjacent parts, although they do not, as a rule, produce secondary deposits in the organ.

J. M.

NEW BOOKS.

Diseases of the Heart. By JOHN COWAN, D.Sc., M.D., F.R.F.P.S.
Pp. xx. + 438. With 202 Illustrations. London: Edward
Arnold. 1914. Price 15s. net.

DR. COWAN has himself been an active worker in the newer fields of cardiology, and his book gives evidence in every chapter of first-hand knowledge of the problems with which he deals. The object of his book is "to present to the practitioner the results which have been attained, and their bearing upon the practical work of diagnosis, prognosis, and treatment." In this effort he has achieved a notable success, and the book is full of points which cannot fail to be of service to those who, whilst engaged in general practice, desire to keep abreast of recent research.

The arrangement of the subject is in keeping with the modern standpoint of the writer. The first chapter is devoted to the myocardium and its diseases, and this is followed by several chapters on arterial disease in relation to the heart. These chapters contain a satisfactory résumé of our present knowledge, but do not add anything material to it. To this section Dr. Ballantyne has written a useful supplementary chapter on ocular manifestations in arteriosclerosis. Following this section is one on the myogenic theory in its application to clinical medicine, including a lucid contribution by Dr. W. T. Ritchie on the electro-cardiograph. In this part of the book one of the most interesting chapters is that on "nodal rhythm," a field in which Dr. Cowan has been a diligent worker. The facts he is able to adduce are certainly quite conclusive as to the occurrence clinically

of such a condition. At the same time one feels that, compared with certain other forms of irregularity, Dr. Cowan has perhaps put it in a place of undue prominence, whether regard be had to its scientific or clinical importance. The chapters on tachycardia, auricular flutter, and auricular fibrillation are in every way excellent. The closing section of the book discusses endocarditis, valvular disease, pericarditis, and myocardial failure. The last of these might have been treated with advantage in an earlier part of the book, where it would have found its natural place alongside the special disturbances of muscle function. The questions of prognosis and of treatment are fully discussed, and the book is illustrated throughout by copious notes of cases which have been under the author's care. These notes, though interesting, are occasionally prolix, and in a new edition would profit by considerable condensation.

The book as a whole forms a clear and satisfactory expression of the modern outlook on heart disease, and never loses touch with the clinical aspects of its subject.

Artificial Parthenogenesis and Fertilisation. By JACQUES LOEB, Member of the Rockefeller Institute for Medical Research. Illinois: The University of Chicago Press, Chicago. 1914. Price 10s. net.

EVER since Owen's work the subject of parthenogenesis has attracted great attention, and its apparent and constant occurrence in bees, where the drones are supposed to arise, according to the old observer Dzierzon, from an unfertilised egg of the queen, has kept up the interest of the laity and of biologists in the subject. Loeb has been an industrious and brilliant worker on parthenogenesis and fertilisation, especially on the action of chemicals on the egg, and he has applied many of the facts of chemistry and physics to the elucidation of these important processes. Loeb's aim in his work is to analyse the "mechanism by which the male sex-cell, the spermatozoon, causes the animal egg to develop" (p. 1), and he has investigated the action of chemical solutions (acids and bases) on the unfertilised egg. It is known that when the gamete enters the egg a membrane is formed, and this membrane formation he has been able to obtain by exposing the unfertilised egg to the action of a monobasic acid or to CO_2 (p. 6); he states a short exposure of such eggs to hypertonic sea-water induces them to develop into larvae. He holds that the membrane induces development by an acceleration of oxidations, and that the spermatozoon not only causes the development of the egg, but also transmits the paternal characters to the developing embryo. Thus the chief point elaborately considered is how the unfertilised eggs of various animals develop into larvae under artificial chemical stimuli. The whole work is most interesting in this light, but of course it excludes the great question of the origin

of the egg and spermatozoon, and their intrinsic properties owing to their primary origin from an early division of the fertilised egg and their possession in their nucleus of determinants for the future embryo.

The whole work is of value to investigators in this special department.

FOREIGN BOOKS

Ursachen und Wesen angeborener Diathesen. Eine experimentelle Studie. Von Stabsarzt Dr. HANS ECKERT. Pp. 68. Berlin: S. Karger. 1913. Price Mk. 3.50.

CZERNY finds support for his views as to the exudative diathesis of young infants in two premises—firstly, that the infant in the first year of life only adds water to its tissues: and, secondly, that the other ingredients of its growing tissues are only derived from stores laid down and obtained *in utero* from the mother. Dr. Eckert has tested both these assumptions by a chemical investigation made upon a litter of young dogs. His results contradict both hypotheses. He finds that from birth the tissues of the puppy steadily lose water; and, further, that the amount of the various chemical constituents of the body does not remain constant nor diminish, but steadily increases.

Anleitung zur Diagnose und Therapie der Kehlkopf-, Nasen- und Ohrenkrankheiten. Von Dr. RICHARD KAYSER. Eighth Edition. Pp. 218. With 136 Illustrations. Berlin: S. Karger. 1914. Price Mk. 5.60.

In its eighth edition, this text-book consists of a series of the author's post-graduate clinical lectures revised and enlarged. The book is extremely practical, and minor operations in this speciality are very fully described, while major operations are indicated but not described in detail. This edition has been brought up to date with a short but lucid explanation of the later work on the functional examination of the labyrinth and its symptomatology in disease. The book is intended for general practitioners, and should prove extremely useful, as great care has been exercised in making the steps of minor operations easily understood.

Die Störungen des Verdauungsapparates als Ursache und Folge anderer Erkrankungen. III. Teil: Die Chronischen Infektions Krankheiten in ihren Beziehungen zum Verdauungsapparat. Von Dr. HANS HERZ. Second Edition. Pp. v. + 275. Berlin: S. Karger. 1914. Price Mk. 9 net.

PART III. of this work is a painstaking and exhaustive inquiry into the relationship of tuberculosis, leprosy, actinomycosis, scleroma, and

syphilis to the digestive system. The subject has been handled with care and insight, and the value of the publication is greatly enhanced by the large number of relevant and valuable references which it contains.

NEW EDITIONS.

Mental Deficiency (Amentia). By A. F. TREDGOLD. Second Edition. Pp. xx. + 492. London: Baillière, Tindall & Cox. 1914. Price 12s. 6d. net.

THE eight years which have passed since the first edition of this book was issued have seen great advances in our knowledge of feeble-mindedness, and this has necessitated a very thorough revision. At the time of its first appearance Dr. Tredgold's book was hailed as one of the most trustworthy expositions of the subject in the English language, and having carefully read the new edition we are glad to be able to endorse the verdict anew. The relationship of syphilis to mental defect has been much studied since the discovery of the Wassermann reaction, and the sections of the book dealing with syphilitic dementia have been brought thoroughly up to date. The work of Vogt and others on tuberculous sclerosis is also adequately referred to. The recent legislation concerning the feeble-minded is fully discussed, and new chapters have been added on case-taking and on mental tests, of which the Binet-Simon series are the best known. As the whole trend of modern legislation will undoubtedly bring on a larger number of medical men the responsibility of dealing with mental defectives, some practical knowledge of the subject will become increasingly essential, and anyone wishing a sound guide cannot do better than get for himself a copy of Dr. Tredgold's work.

The Essentials of Chemical Physiology, for the Use of Students. By W. D. HALLIBURTON, M.D., LL.D., F.R.S. Eighth Edition. Pp. xi. + 324. With 72 Illustrations. London: Longmans, Green & Co. 1914. Price 5s. net.

A BOOK which has reached its eighth edition has justified its existence and needs no lengthy review. The general scheme remains unchanged, but almost every page, as the author indicates in his preface, bears evidence of careful revisal, and in its present form the work is thoroughly up to date. The course through which the student is conducted consists of twenty-five lessons gradually leading from the simpler to the more complex problems of physiological chemistry. The first part of each lesson consists of concise practical instructions for the performance of certain chemical tests, and the remainder of the lesson develops the underlying themes. It would be difficult to find a better book to place in the hands of a student who is commencing a course of chemical physiology.

ANALYTICAL REPORTS.

ISTIN; ACITRIN.

(THE BAYER COMPANY, LTD.)

ONE of the new synthetic laxatives, "Istin," seems to present many advantages. It is closely related to the active cathartic principle of aloes, senna, and rhubarb, and acts by stimulating the peristalsis of the large bowel alone. The advantages claimed for it are absence of griping pain or other undesirable symptoms. It is useful in all cases of obstinate constipation, especially in bedridden patients. Being uniform in composition, accuracy of dosage can be assured. It is put up in tablets. Like the drugs to which it is related, it may impart a reddish colour to the urine, but this is of no consequence.

The same makers have placed a new remedy for gout and rheumatism on the market under the name of "Acitrin," which materially increases the amount of uric acid excreted. It is the ethyl ester of phenyl cinchon-uric acid, and being slower in action than the pure acid, does not produce renal colic. As an adjunct to ordinary dietetic and general treatment of gouty affections it will be found most helpful.

HYPOPHYSIN.

(MEISTER LUCIUS & BRÜNING, LTD.)

This is a sterile 1-1000 solution of the isolated active constituents of the pituitary gland in chemically pure form, put up in 1 c.c. ampouls. Its action on the uterine muscles renders it useful in many of the contingencies of obstetric practice, and its effect on the cardio-vascular mechanism in raising the blood-pressure and strengthening the action of the heart makes it a valuable resource in the treatment of shock and other surgical conditions associated with low blood-pressure. It has also been efficacious in post-operative intestinal paralysis. It may be given intra-muscularly, subcutaneously, or intravenously, and it is said to produce no local irritation or general toxic symptoms.

NESTLÉ CREAM—MILKMAID BRAND.

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To those who have difficulty in securing locally a pure and reliable supply of cream for invalids, or for ordinary domestic use, we can strongly recommend the preparation sent out by the Nestlé Company. It is thick and rich and has all the qualities of the best fresh dairy produce.

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LAXAMEL.

(BURROUGHS WELLCOME & CO.)

"Laxamel," which is in the form of a jelly, presents "paraleine" combined with a base which renders it acceptable to those who find difficulty in the

ingestion of liquid paraffins, and is of value in the treatment of constipation dependent upon deficiency of lubricating material in the bowel. It modifies the consistency of dry hardened faecal material and assists in its evacuation.

"VAPOROLE" NUCLEIN.

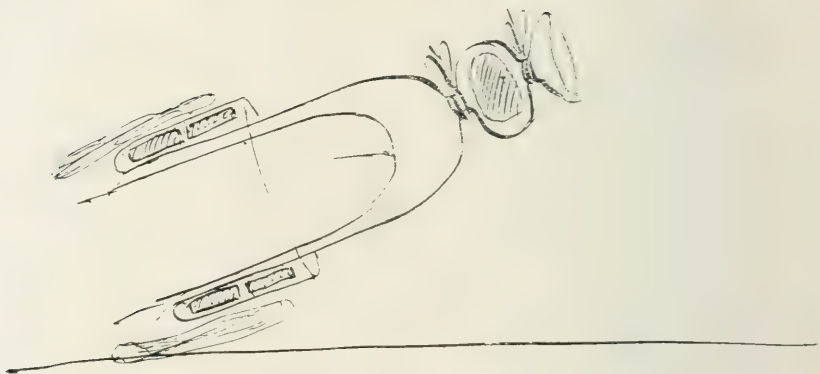
BURROUGHS WELLCOME & Co.)

We have received from Messrs. Burroughs Wellcome & Co. a very convenient preparation of nuclein in sterile solution—0.03 gm. (gr. $\frac{1}{2}$). Nuclein, a preparation of yeast, is issued under the "Vaporole" brand, in hermetically-sealed glass containers which have been specially designed for convenience in hypodermic medication. The use of this nuclein product is intended to increase the bodily resistance to bacterial invasion, by stimulating leucocyte formation and raising the opsonic index. Nuclein has been employed with benefit in tuberculosis, diphtheria, and in other bacterial affections.

BOOKS RECEIVED.

- AMBARU, L. *Physiologie Normale et Pathologique des Reins* . . . (F. Gittler, Paris) fr. 17.
 ARMSTRONG, W. E. M. *I. K. Therapy, with Special Reference to Tuberculosis* . . . (H. K. Lewis) 7s.
 CITRON, J. *Immunity*. Second Edition . . . (J. & A. Churchill) 14s.
 COAKLEY'S Archives, Vol. L, No. 1, April 1914 . . . (New York) 50 cents.
 COLEMAN, F. *Extraction of Teeth*. Second Edition . . . (H. K. Lewis) 3s. 6d.
 COURTADE, D. *Notions Pratiques d'Electrotherapie Appliquee a l'Urologie* . . . (F. Gittler, Paris) fr. 10.
 DUNN, W. E. N., and G. V. WORTHINGTON. *Luxuries & Health Resort* . . . (H. K. Lewis) 1s. 6d.
 ELLIOT, R. H. *Sclero-Corneal Trephining*. Second Edition . . . (Pulman & Sons, Ltd.) —
 FREUD, S. *Psychopathology of Every-day Life* . . . (T. Fisher Unwin) 12s. 6d.
 GREGOR, A. *Lehrbuch der Psychiatrischen Diagnostik* . . . (S. Karger, Berlin) Mk. 5.20.
 HEURLIN, M. A. *Bakteriologische Untersuchungen* . . . (S. Karger, Berlin) Mk. 12.
 HEURLIN, M. A. *Bakteriologische Untersuchungen der Genitalsekrete* (S. Karger, Berlin) Mk. 12.
 HEWLETT, R. T. *A Manual of Bacteriology*. Fifth Edition . . . (J. & A. Churchill) 10s. 6d.
 HOWARD, H. C. *The Therapeutic Value of the Potato* . . . (J. & A. Churchill) 4s.
 KELLOGG, W. E. *A Text-Book of General Embryology* . . . (Constable & Co.) 10s. 6d.
 KELLOGG, W. E. *Outlines of Chorionic Development* . . . (Constable & Co.) 10s. 6d.
 LOCKHART-MUMFERY, P. *Diseases of the Rectum and Anus* . . . (J. & A. Churchill) 7s. 6d.
 M'GOWAN, J. P. *Investigation into the Disease of Sheep called "Scrapie"* . . . (Wm. Blackwood & Sons) —
 MACMUNN, C. A. *Spectrum Analysis applied to Biology and Medicine* . . . (Longmans, Green & Co.) 5s.
 MARGULIES, A. *Diagnostik der Nervenkrankheiten, Vol. I.* . . . (S. Karger, Berlin) Mk. 3.
 PAPIN, E. *Manuel de Cystoscopie* . . . (F. Gittler, Paris) fr. 15.
 PAPPENHEIM, A., and R. DONALDSON. *Clinical Examination of the Blood and its Technique* . . . (John, Weidat & Sons, Ltd.) 3s. 6d.
 RIDGIE, W. T. *Artificial Flutter* . . . (W. Green & Son, Ltd.) 10s. 6d.
 SAVAGE, W. G. *The Bacteriological Examination of Food and Water* . . . (Constable & Co.) 7s. 6d.
 SCHINDLER, C. *Der Salvarsanstoff* . . . (S. Karger, Berlin) Mk. 4.80.
 SCHLAEFER, J. *Das Urethra Inodien* . . . (S. Karger, Berlin) Mk. 10.
 SYKES, M. C. *Why Early Death?* . . . (St. Catherine's Press) 1s.
 THEILHÄBER, A. *Die Entstehung und Behandlung der Karzinome* . . . (S. Karger, Berlin) Mk. 7.
 THIBBES, W. *Dietetics of Food in Health and Disease* . . . (J. & A. Churchill) 12s. 6d.
 TRANSACTIONS of the American Gynecological Society, 1913. Vol. XXXVIII. . . . (W. J. Darman) —
 TRANSACTIONS of the American Pediatric Society, 1913. Vol. XXV. . . . (Chicago) —
 TRANSACTIONS of the Cremation Society of England. No. XXVII. . . . 6d.
 WHITTAKER, C. R. *A Manual of Surgical Anatomy*. Second Edition (E. & S. Livingstone) 6s.
 ZEITSCHRIFT FÜR SEXUALWISSENSCHAFT. Band 1, Heft 1. April 1914 . . . (Maurus & Weber's Verlag) —

The Indian rubber tie for dressing stumps



Bed

Drawn by Prof. Leston. April 5. 69

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

The Residents' Club,
R.I.E.

THE Twentieth Annual Dinner of the Edinburgh Royal Infirmary Residents' Club was held on 26th June. Mr. J. M. Cotterill, President, occupied the chair. There was a large gathering of past and present Residents, including several who were members of the same mess as the President. In proposing the toast of "The Residency" the President, following the tradition of the Club, was frankly reminiscent. It was in 1869 that he received his baptism of blood in the operating theatre of King's College Hospital, when he saw Sir William Fergusson excise the upper jaw for sarcoma. Soon after he joined the Edinburgh School—just at the time that Lister was promulgating the antiseptic idea—and having lived through the period of transition from the old dispensation to the new, and having seen the whole evolution of the Listerian system, he was able to recall to the older members of the Club some interesting reminiscences, and to recount to the younger generation many episodes of historical as well as personal importance. Of his old chiefs, his colleagues in the residency and on the staff, and of some selected patients he had recollections grave and gay, and the address, throughout racy, was in passages genuinely eloquent.

Gleanings from a
Student's Notebook, 1869.

THROUGH the kindness of Mr. Cotterill we are enabled to give a few extracts from the hospital notebook of a student—"James Cumming, 18 Ainslie Place"—who followed Professor Lister in the late sixties. One entry is dated 1867, the year in which the antiseptic system was introduced, but the first reference to Lister's work in the wards is superscribed "Glasgow, 23rd March 1869." The notes would appear to have been made at the bedside during the ward visits, and they illustrate the minute care which Lister bestowed on every detail of his work, and the importance he attached at that time to the exclusion of air from the wound during the dressing. In nearly every entry we read of "pieces of calico soaked in 1 in 40" being placed over the wound; of lint being "slipped under the plaster" and "gradually removed so as not to let any germs in."

With a view to preserving an antiseptic atmosphere around the wound after amputation, the following ingenious device was adopted:—"The stump is enclosed in a sheet of indiarubber and a knot tied

round the end. Then a piece of lint soaked in glycerine and carbolic acid is placed within the tube, and another knot tied beyond this so that the piece of lint is kept near the stump, but not touching it. Two pieces (strips) of lint are applied round the upper part of the stump, which act as reservoirs of carbolic acid. Over all a cloth is wrapped to absorb the discharge." Opposite this note is pasted a diagram drawn by Lister's own hand, which we reproduce. In this contrivance do we not find the forecast of the carbolic spray?

Here are the notes of a "case of amputation through the trochanter for malignant disease. "*Operation*—the sponges were dipped in 1-40 (watery solution), also the instruments and Mr. Lister's fingers. The saw dipped in an oily solution. Mr. Lister cut a large inner flap (quadrangular) and a short outer one. Femoral artery secured with antiseptic ligature of catgut. The rest twisted. The wound was washed out with 1-20 (watery). Flaps brought together except at the most dependent part to allow vent to discharge. A piece of lint dipped in 1-10 oily solution was then introduced into the wound to be removed in the evening. A double layer of lac plaster (stripped of its calico) was applied over the stump. This enveloped by oilsilk to prevent any air entering by cracks—a cloth bandage."

A large part of the notebook is taken up with prescriptions, a cursory examination of which does not suggest that the art of prescribing has undergone many important changes in the last half century. Two methods of treatment, however, are described which seem to have, undeservedly, fallen out of use. "*For gonorrhoea*: An emetic. Two purgative pills in the evening and an aperient draught in the morning. Then emplastr. lyttae 6 x 4 inches applied high up in anterior and inner aspect of each thigh, removed in the morning, and water dressing and a saline purgative. Low diet, and inject a syringe-ful of water now and then. Cure in 4 to 6 days." "*Diseases of Children*.—*For diarrhoea*, strip the child and cover it with a muslin coverlet. Allow a current of air. After every loose stool, bathe it in ice-cold water for two or three minutes till the skin is hard and cold. Give iced water alone or with milk and a few drops of brandy (if much exhaustion). No medicine. Except in strumous children, this is sufficient." What more is required for strumous children is not forthcoming.

Appointment.

DR. W. E. CARNEGIE DICKSON has been appointed Director of the Pathological Department of the Royal Hospital for Diseases of the Chest, London.

The Summer Medical Graduation, University of Edinburgh.

AT the Graduation Ceremonial held on 10th July 1914 the following received the degree of *Doctor of Medicine*:—

Thomas M. Anderson, Scotland; James W. Cairns, Scotland; Edward

F. Coghlan, England; John Crocket, Scotland; *James A. Cruickshank, Scotland; **John M. Dewar, Scotland; *Thomas R. Evans, Wales; *Kenneth Fraser, Scotland; ***John D. Gunn, Australia; *William R. C. Heslop, England; John Hume, Scotland; Edward C. C. Maunsell, Ireland; Reinhard C. J. Meyer, South Africa; Robert Park, Scotland; *Allan H. Porter, Scotland; James N. M. Ross, Scotland; S. F. Silberbauer, South Africa; William D. D. Small, Scotland; Morton W. Smart, Scotland; ***Sydney A. Smith, New Zealand; Kesavan R. Tampi, India; John Tennant, Scotland; Alex. B. M. Thomson, Scotland; Muhammed A. Wajid, India; Arthur S. Walker, England; ***Allan Watson, Scotland; William H. Williams, Wales; **Leonard S. Willox, Scotland.

***Awarded Gold Medal for Thesis. *Highly Commended for Thesis.

*Commended for Thesis.

The degrees of *Bachelor of Medicine* and *Bachelor of Surgery* were conferred on R. C. Aitchison, Scotland; H. S. A. Alexander, Scotland; R. H. Alexander, Scotland; B. C. Ashton, England; Christopher Atkinson, Ireland; Mary A. H. Baird, Scotland; R. G. Bannerman, Scotland (1st class Hons.); Rachel M. Barclay, Scotland; R. C. L. Batchelor, Scotland (1st class Hons.); H. W. Bell, England; J. G. Bell, Scotland; J. W. Bennett, Ireland; S. E. Bethell, England; James Biggam, Scotland; H. B. Binks, England; W. Bird, England; E. J. Blair, Scotland; A. B. Brook, Scotland; H. P. Caithness, England; Angus Cameron, Scotland; R. E. Cameron, Scotland; H. E. Collier, England; A. N. Craig, Ireland; J. W. Darling, Scotland; T. M. Davie, Scotland; W. M. Dickson, Scotland; C. L. Dold, South Africa; C. E. Dukes, England; G. K. Edwards, England; J. D. Evans, Wales (2nd class Hons.); F. B. Eykyn, England; G. D. Fairley, Scotland; Stanley Fenwick, Scotland; T. C. Findlater, Scotland; Elspet Fowler, Scotland; H. R. Friedrichs, Scotland; T. A. Fuller, South Africa; H. J. C. Gibson, Scotland; R. E. Gibson, England; D. J. Glen, Scotland; A. S. Glynn, England; H. P. T. Haddow, England; A. R. Hamilton, Ireland; N. E. M. H. Hay, Scotland; J. J. Healy, England; G. F. P. Heathcote, South Africa; F. Henderson, Scotland; Gertrude M. A. Herzfeld, England; J. B. Hogarth, England; K. Husain, India; Florence E. Inglis, England; B. O. Jarrette, Trinidad; C. P. M. Joubert, South Africa; P. W. J. Keet, South Africa; C. G. Lambie, Trinidad; S. J. A. Laubscher, South Africa; Louis Levy, New Zealand; Peter MacCallum, New Zealand (1st class Hons.); Thos. M'Fetridge, Ireland; R. M. Mackay, New Zealand; E. F. W. Mackenzie, New Zealand; E. L. Mackenzie, South Africa; J. J. R. Mackenzie, Scotland; Jessie A. MacLaren, Scotland; I. K. F. MacLeod, Scotland; Jean M. M'Minn, Scotland; F. G. Maenaughton, Scotland; Edward Mansfield, Australia; V. H. Mason, England; D. J. Max, New Zealand; B. Mendelssohn, South Africa; G. Millar, Scotland; R. W. Miller, Scotland; E. M. Molesworth, England; G. T. Mowat, Scotland; R. M. Muir, New Zealand; W. Murdoch, Scotland; J. C. Neil, Scotland; H. S. Palmer, England; C. C. Philip, Scotland; G. S. Pirie, South Africa; Reginald Power, Australia; J. M. Pringle, Scotland (1st class Hons.); Mirza Razakhan, India; H. A. Rippiner, England; R. L. Ritchie, Scotland; H. C. Robins, Jamaica; Chas. Sand, South Africa; A. C. Shaw, Ireland; H. K. Shaw, Scotland; Bertram Shires, England; H. J. Simson, Australia; H. C. Sinderson, England; T. W. Smart, England; A. H. D. Smith, Wales (2nd class Hons.); D. M. Smith, Scotland; A. S.

Taylor, Ireland ; J. S. Taylor, Scotland ; A. B. Theron, South Africa ; A. R. Thomson, Canada ; R. O. C. Thomson, Scotland (1st class Hons.) ; Roland Thorp, England ; F. E. Tillyard, England ; Pierre du Toit, South Africa ; Janet P. Walton, Scotland ; Chik Hing Wan, China ; H. D. Welply, Ireland ; H. P. W. White, New Zealand ; G. S. Williamsen, Scotland ; D. G. Wishart, Scotland (2nd class Hons.) ; E. W. N. Wooller, England ; P. C. V. Woudberg, South Africa ; B. E. Wright, New Zealand ; G. D. Yates, England ; J. B. Young, England.

The Diploma in Tropical Medicine and Hygiene was awarded to G. A. Borthwick, L. G. Fink, W. Mackenzie, Douglas Martin, S. L. Mitra, S. R. Rao.

Thesis Gold Medals were awarded to John Donald Gunn, Sydney Alfred Smith, Leonard Stephen Willox.

The following honours were also awarded :—

The Cameron Prize in Practical Therapeutics to Professor Paul Ehrlich, Director of the Royal Institution for Practical Therapeutics, Frankfurt, for his discovery of salvarsan, and its valuable therapeutic effects in syphilis and also for his researches on numerous synthetic organic compounds of arsenic, and on immunity.

The Gunning Victoria Jubilee Prize in Forensic Medicine—Sydney Alfred Smith, M.D.

The Ettles Scholarship—Ralph Campbell Lindsay Batchelor, M.A., M.B., Ch.B.

The Allen Fellowship in Clinical Medicine and Clinical Surgery—Douglas James Glen, M.B., Ch.B.

The McCosh Graduate's and Medical Bursaries—Robert George Bannerman, M.A., M.B., Ch.B.

The Beaneey Prize in Anatomy and Surgery—Peter MacCallum, M.A., M.Sc., M.B., Ch.B.

The Mouat Scholarship in the Practice of Physic—Ralph Campbell Lindsay Batchelor, M.A., M.B., Ch.B.

The Conan Doyle Prize—Charles Pieter Marais Joubert, M.B., Ch.B.

The Annandale Gold Medal in Clinical Surgery—Ion Keith-Falconer MacLeod, M.B., Ch.B.

The Buchanan Scholarship in Gynecology—Peter MacCallum, M.A., M.Sc., M.B., Ch.B.

The James Scott Scholarship in Midwifery—Andreas Bernhardus Theron, M.B., Ch.B.

The Dorothy Gilpilan Memorial Prize—Gertrude Marian Amalie Herzfeld, M.B., Ch.B.

The Wellcome Medals in the History of Medicine.—Gold Medal, Joseph Schneider ; Silver Medal, William Everett.

The Pattison Prize in Clinical Surgery—Andrew James Caird, M.A. ; William Goldie, M.A. (equal).

The Wightman Prize in Clinical Medicine—Robert George Bannerman, M.A., M.B., Ch.B.

The Cunningham Memorial Medal in Anatomy—Robert Walker.

The Whiteside Bruce Bursary—Henry James Parish.

The degree of *Doctor of Science* in the Department of Pure Science was awarded to Thomas Graham Brown, B.Sc., M.B. ; James Argyll Campbell, M.D. ; Andrew Young, M.A., B.Sc.

A NEW ROUTE OF INQUIRY AS TO THE NATURE
AND ESTABLISHMENT OF THE TYPICAL SEX-
ENSEMBLE IN THE MAMMALIA.

By D. BERRY HART, M.D., F.R.C.P.E.,

Lecturer on Midwifery and Diseases of Women, Surgeons' Hall, Edinburgh.

"La Nature est intentionnelle dans son but, mais aveugle dans son action."

CLAUDE BERNARD.

II.

INDEX OF ARGUMENT.

15. The P. G. C. mass probability distribution and maturation the causes of variation, the one causing variation without loss of determinants, the other by means of losses of determinants (pp. 106-111).
16. Sex phylogenesis must be studied to explain the origin of the heredity cells and derived gametes and that of the duct portion of the genital tract (pp. 111-115).
17. Enumeration of the unit characters in lower mammals as compared with man (p. 115).
18. *Summary*.—Sex established early in phylogeny by the formation of gametes from protozoa, *i.e.* primitive germ and sperm cells outside an organism; the human genital duct elements due to successive polar-body losses of the autonomous determinants causal to the unit characters, combined with their establishment pure and in default in the heredity cells; natural selection as an eliminant (pp. 116-119).

For clearness and convenience, the Nature of Mitosis, of Maturation, and of the Distribution in the P. G. C. Mass will best be considered under the following heads:—

I. The Changes during the Formation of the P. G. C. Mass and at Mitosis and Maturation.

II. Modern views as to the Nature of Matter, of Electrons and Ions in relation to the Phenomena noted in the preceding heading.

I. THE CHANGES DURING THE FORMATION OF THE P. G. C. MASS
AND AT MITOSIS AND MATURATION.

As already explained, when the zygote is formed, a part is set aside to form the somatic part of the future plant or animal, while the other portion forms the p. g. c. mass for the heredity cells of the individual. There is thus a multiplication and distribution of determinants. The somatic portion gets an Id. of determinants but no so-called sex-determinants. In the p. g. c. mass, which gives the future heredity cells the determinants are assigned in a probability distribution, as

this, we shall see, is the mathematical way we must look on the behaviour of molecules (see pp. 107, 108). The measurable adult qualities of progeny are thus, when measured biometrically in sufficient numbers, found to give a frequency polygon.

The Structure of a Somatic Cell.—Without going into too much detail we may consider an ordinary somatic cell as made up of cytoplasm and a nucleus. The nucleus shows under appropriate stains the chromosomes, the number of such varying in different animals.

The chromosomes in a somatic cell contain the causal determinants for similar cells, and it is highly probable that by the mitosis in these, such cells multiply, but such determinants exist only for these cells and cannot change into heredity cells. Their heredity power is thus limited to the reproduction of their like. The idea which has so long unfortunately ruled embryology, that somatic cells can give rise to heredity cells in mammalia, as, for instance, that the germ or capsular epithelium covering the ovary can give rise to its oöcytes, is quite erroneous, and has arrested progress in the mechanism of evolution for many years. It is now being slowly eliminated, and the view of the derivation of the origin of the heredity cells from an early division of the zygote is taking its place. The phylogenesis of the somatic cell is that it is probably derived from the heredity cell and not *vice versa* (see *antea*, p. 14).

The Multiplication of Somatic Cells by Mitosis.—When a somatic cell multiplies by mitosis we get a very striking series of changes (Pl. V., Fig. A.).

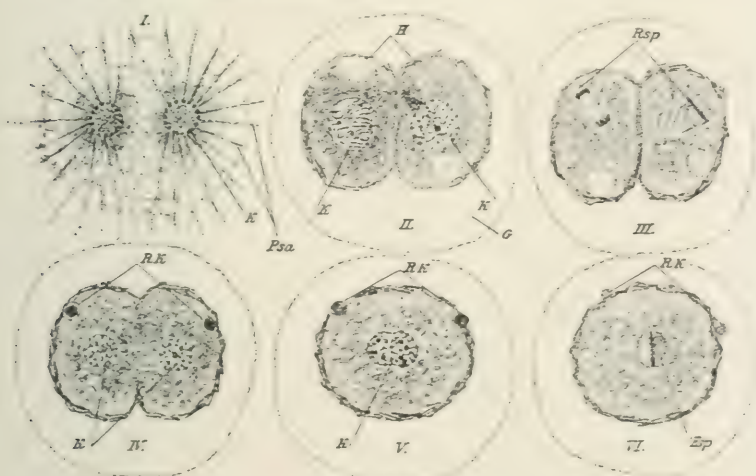
MITOSIS.—This is a very complicated process, but without going into too much detail we may, in a somatic cell undergoing it, recognise—(1) *prophase*, beginning with a skein condition with two centrosomes. Then comes the achromatic spindle with the skein broken up into distinct segments; finally they form a ring round the equatorial plate. This finishes the prophase. (2) In the metaphase the nucleus divides into similar halves (Flemming) which then separate in (3) anaphase and (4) telophase (see Pl. V., Fig. A.).

A minute structure known as the centrosome is apparently intimately connected with the mitotic changes, and if we follow current views we get its apparent division into two, accompanied by a rearrangement and division of the chromatin filaments and particles of the chromosomes between these two. At the end of the prophase we get the centrosomes, lateral and radiating lines

PLATE V.



A. Partially selected figures of cell and nuclear division in asexual reproduction of *Actinophrys sol*. K, nucleus; Pst, pseudopodial axes. 1. Resting cell. 2. Centrioles after mitosis. 3. Prophase, chromosomes at poles and spindle well formed. Chromatin of nucleus in four chromosomes. 4. Mutterstern stage, chromosomes at equator. 5. Metaphase, chromosomes split longitudinally move to the poles. 6. Anaphase, the body of the cell begins to divide. 7. Division of body-cell nearly finished, nuclei passing into skein stage.



B. From Schaudinn, to show stages in copulation of *Actinophrys sol* (Ehrenberg). I. Two free-swimming individuals copulated. K, nucleus; Pst, pseudopodial axes. II. Beginning of encystment; G, jelly envelope; H, inner envelope; K, nuclei with spindle development. III. In encystment. IV. In encystment. V. Nuclear union and polar bodies passing through cell membrane. VI. Beginning of the metaphase, the polar bodies degenerating and losing staining power. (See text, p. 112.)

joining them on each side with the central equatorial plate. The chromosomes then divide longitudinally (metaphase), arrange themselves in two V-shaped and equivalent groups with radiating structural lines connecting them to the centrosome; finally the lines disappear and we get two complete cells with a centrosome at each lying outside, and a new nucleus with a skein-like arrangement of the chromosomes. From the longitudinal division each derived cell contains the same number of chromosomes as the mother-cell, most probably by a doubling and segregation of the determinants.

It may be urged that as in the final stage each cell may have a centrosome outside, this militates against my view that they are collections of ions, and is in favour of their having a directive power in cell division. It may be, however, that they are really ejected ions giving slight extra variation to cells arising from mitosis, and are thus allied to polar bodies. (See under II. below).

The Changes in the Heredity Cells at Maturation, i.e. prior to Fertilisation.—These are best studied in *ascaris megalocephala*, as has been done by Boveri and others. We have seen that the number of chromosomes in a somatic cell varies according to the animal or vegetable cell studied, and the same holds good for the heredity cells. In the variety of the *ascaris* studied they are four in the zygote, and this makes the enumeration of them, in their various changes, easy. From Pl. V., Fig. B., the changes in fertilisation of *Actinophrys sol* are readily seen, and the result is that prior to fertilisation half the chromosomes are thrown off (so-called polar bodies) from each heredity cell (oöcyte and spermatid), and thus by this reduction the union of these gametes makes up for the new zygote the proper number. The reduced oöcyte and spermatid each contains half the chromosomes; they are then termed gametes, while the zygote or fertilised ovum, by the union of two gametes, necessarily contains the proper and full number.

II. MODERN VIEWS OF IONS AND ELECTRONS AND MATTER IN RELATION TO THE PHENOMENA DESCRIBED UNDER I. AS MITOSIS AND MATURATION.

The view to be advanced, under this heading, as to mitotic and maturation changes is that the former are due to the interchange and temporary persistence of negative and positive ions, that the throwing off of the polar bodies in maturation is an ejection of ions, that the former changes (mitosis) give rise to continuous variation expressed by a frequency polygon, the latter (maturation) by marked variation, the discontinuous variations of Bateson or mutations of de Vries.

The cell ion may be considered as purely electronic or as an exceedingly minute particle of matter—in this case albuminous—electrically charged; and that this material view of its *physical* constitution is a feasible one in the present connection is shown by the staining processes which demonstrate the centrosomes and filaments joining them. We may regard the filaments and centrosomes as streams and masses of ionised albuminoids (determinants) taking up the special stains employed.

To consider the appearance at Pl. V., Fig. 4 A., as a magnetic field does not help, and any comparison of the radiating filaments to Faraday's lines of force, much as this idea has advanced electrical conceptions, gives no clear explanation. Light, however, is thrown on this subject by Faraday's ionisation theory, the result of his electrolysis of fluids, and by the ionisation of gases as described by Sir J. J. Thomson and others. If we combine with this the modern conception of electricity on the electron theory a clearer view can be formulated as to the mitotic and maturation changes.

Faraday showed that when an electric current is passed through a solution of common salt, sodium is deposited at one pole, the positive, and chlorine given off at the other, the negative. He also proved that the amount of sodium deposited depended on the valency of the metal and the amount of the E.M. force. He formed the fertile theory of ions, the "travellers," and supposed that in the electrolysis of NaCl the electricity atoms combined with the sodium one, and travelled to their appropriate pole. The ion here, therefore, is a charged particle of sodium and electricity in definite proportions.

The view of Grotthuss, held for long, was that the electrical current decomposed the molecules of the electrolyte and that free ions were given off at the poles, the ions between combining temporarily. It was ultimately seen that this was untenable, as the current was not strong enough to decompose water or the chemical solution used in the experiment. A striking and important theory was advanced by Clausius which clears up many difficulties. Clausius holds that in acidulated water undergoing electrolysis the molecules (H_2O) do not exist as such but as ions, H and OH, constantly forming and combining. There is thus a certain number of ions free and the electrical current directs these to their appropriate poles. We may look on albumin in the same way. In the chromosomes there are always a certain small number of ions free, and these during mitosis undergo electrolysis, *i.e.* polar direction, in a way to be presently considered.

Constitution of Matter.

We may here note that according to Sir J. J. Thomson we may regard matter as electronic. The electron has the property usually attributed to matter, of mass and inertia, and thus we may exclude the idea of matter as something apart from electrons and regard it as purely electronic. Protoplasm, then, under this view would consist of molecules, certain combinations of electrons, with balanced charges, while in the ions, positive or negative and derived from the molecule, we would have an excess electron or electrons in the negative and one or more fewer in the positive. This gives, therefore, a more simple idea of mitosis. It is under some stimulus that the ions are formed and attract or repel. We may thus regard the protoplasmic molecules and ions as electrically charged matter or as electrons.

Giese, Sir J. J. Thomson, and his followers have extended the view of ionisation to gases with an interesting result on the points discussed.

I may, therefore, here quote M. Lucien Poincaré's clear account on gas ionisation:—"Suppose we pass through some gas, such as hydrogen, at ordinary pressure, a pencil of X-rays. The gas, which till then has behaved as a perfect insulator, suddenly acquires a remarkable conductivity. If into this hydrogen two metallic electrodes in communication with the two poles of a battery are introduced, a current is set up in very special conditions which remind us, when they are checked by experiments, of the mechanism which allows the passage of electricity in electrolysis, and which is so well represented to us when we picture to ourselves this passage as due to the migration towards the electrodes under the action of the field, of the two sets of ions produced by the spontaneous division of the molecule within the solution" (*op. cit.*, p. 239).

Electrons or Electrical Atoms.—The modern theory of electricity is that it is one, and that what are called positive and negative currents can be explained as follows:—

The result of Crooke's well-known experiment of passing a powerful electric current through a closed glass tube with as perfect a vacuum as possible is that from the cathode negative atoms of electricity, at one time called radiant matter by Crookes, escape, while positive atoms, not isolated as such, issue from the anode. Crookes's radiant matter consists of electrons or corpuscles negatively charged and formed by the disintegration of neutral atoms.*

* "The electron is the smallest electrified body capable of separate existence" (F. d'Albe), and repels another electron, the converse of what happens to particles of ordinary matter.

The negative and positive ions differ in regard to the number of atoms of electricity they contain, the negative having one electron in excess, while the positive ion contains an electron or corpuscle fewer than the negative one. The negative current in electricity has thus an excess corpuscle in its atoms, and therefore electricity is one, not two conditions.

Thus the molecule of protoplasm is neutral, *i.e.* has in it or is actually made up of balanced positive and negative charges. The electrons are in a state of whirl, and thus electrons are thrown off, giving ions, positive and negative, the former with an electron or electrons less, the latter with an electron or electrons in excess. All these states, molecules, positive and negative ions in relatively smaller numbers, may be considered as being present in protoplasm.

I now go on to suggest that it is the transient development and interchange of such ions that may be regarded as giving the mitosis in developing cells and maturation in approaching fertilising cells.

15. MITOSIS AND MATURATION THE CAUSES OF VARIATION; THE ONE CAUSING VARIATION WITHOUT LOSS OF DETERMINANTS, THE OTHER VARIATION BY MEANS OF THEIR LOSS.

Weissman's generalisation that the determinants in the heredity cells and zygote are causal to the developed organs in the adult organism, and the evident corollary that an environmental variation of the body or soma must be rendered causal in the oöcytes and spermatids to be transmitted, has done much to clarify one's ideas as to the cause of variation. No one has as yet given any mechanism by which an extrinsic somatic variation can be made causal, and pangenism, mnemism, etc., have been tried, only to be found wanting.

Weissmann's theory of the causality of the determinants in the germ-plasm to the adult structures is based on *a priori* reasoning, but need not remain in a generalised form. We may be able to group such determinants, and ultimately give their relations to one another.

The *sex-ensemble*, typical and atypical, is a probability result and we are therefore driven to the query, At what period of ontogenetic rearrangement of determinants could such a probability distribution occur? The answer undoubtedly is, at the formation of the p. g. c. sperm- and germ-cell mass. At that time a *sex-*

ensemble molecule would be formed containing its electronic determinants. These by maturation at fertilisation and by p. g. c. mass distribution would be in mammals varied until we got the stable arrangement of the typical *sex-ensemble* molecule, and the varied set for deformities and for atypical sex.

The relation of such molecules to the others in space is more difficult. That there are definite static groupings is suggested by the remarkable cases of inversion of abdominal and thoracic organs, an inversion that may be explained by a supposed half-turn at an early period in static determinant arrangement.

I now go on to suggest that, on Weissman's view given above and the facts and theories under heads I. and II., an intrinsic theory of variation can be formulated which throws light on the subject.

The two processes going on in the chromosomes of the nuclei of the heredity cells, best worked out in the oocytes, and prior to fertilisation, are mitosis and maturation: in the former continuous variation takes place in the chromosomes of the heredity cells; in the latter on each side the chromosomes are reduced to one half.

It is therefore in the pro- and metaphase stage of the mitosis where the centrosomes, one at each side, have the spindle-shaped filaments between them, that we get a real electrolytic picture, the centrosomes being looked on as *each a collection of ions, while the radiating filaments are streams of ions passing to one or other pole, positive or negative*. Thus mitosis may be regarded as an electrical phenomenon, and the various changes can be explained on the theory that the determinants in the chromosomes behave as neutral molecules or as negative or positive ions, and act under the ordinary convention that like repel and unlike attract. The centrosomes, as said before, are accumulations of ions equivalent to the + and - poles. These centrosomes are usually considered as having some directive influence on mitosis, but no explanation has been given as to how they act in this capacity.

In mitosis, therefore, we have an electrolysis, the ions being directed to their appropriate poles and some of them being ejected—the centrosomes—so as to cause variation.

Maturation is an actual ejection of chromosomes at fertilisation, owing to some chemical stimulus to be discussed later on. If, then, the determinants in mitosis act in this manner, it may be asked, Can their movements be described under any mathematical formula? Supposing one could observe the rates of movement,

distances travelled, impact, and distributions in amount made in the molecules during mitosis and maturation, is there any generalisation that would enable us to understand the probability polygons by which the sizes and functions of the organs in the adult organism are expressed? For this we must consider the behaviour of gases in a closed space and the emission of particles from radium.

In a closed vessel filled with gas at ordinary temperature and pressure, the pressure on the walls is due to the impact of the molecules. The speed of these varies, but according to Clerk Maxwell we can regard the amount of their various impacts as expressible by a frequency polygon.

On this point M. Lucien Poincaré remarks (*op. cit.*, p. 100):—"It was Maxwell who first thought of introducing into the kinetic theory the calculation of probabilities. Willard Gibbs and Boltzmann later on developed this idea and have founded a statistical method which does not, perhaps, give absolute certainty, but which is certainly most interesting and curious. Molecules are grouped in such a way that those belonging to the same group may be considered as having the same state of movement; then an examination is made of the number of molecules in each group, and what are the changes in this number from one moment to another. It is thus often possible to determine the part which the different groups have in the total properties of the system and in the phenomena which may occur."

A similar condition is also supposed by Arrhenius to exist in the emission of particles from radium. "The number of α -particles emitted by a solid radio-active substance in unit time is not constant but changes according to the theory of probability."

We thus see that molecules and ions may be considered as having their movements and distribution recorded by a frequency polygon, and thus the frequency polygon in measurement of adult organs given by biometry.

The question may be summed up as follows:—

Mitosis is the result of the movements of ions, *i.e.* electrified albuminoid determinants. In the single skein arrangement we have neutral molecules moving under Brownian movement, and on this Reuss says that small particles in a fluid are moved by an electric current. This indicates that they carry a certain electric charge. The surrounding fluid is charged with the opposite electricity, and is therefore carried in the opposite direction by the current.

Brownian movement may thus be regarded as due to an

electrical reaction between the fluid and the particles, whereas in mitosis and maturation the reaction is between the ions.

When we have double filaments in mitosis these are charged with like electricity, and therefore are repelled, *i.e.* separate, and necessarily equal in size to the eye. The same holds good for particulate conditions of the chromosome. In the spindle arrangement between the centrosomes, which I suppose to be collections of ions, and the filaments of the spindle, ions travelling to the centrosomes, we get electrolysis going on, *i.e.* separation and segregation of groups of determinants for redistribution.

Maturation.—If we take Sir J. J. Thomson's corpuscular theory of the atom of matter as consisting "of a large number of corpuscles" (electrons) "all electrified negatively and held together by positive electricity equivalent in amount to the sum of the negative charges of all the corpuscles so as to produce an electrically neutral atom" (Mellor, *op. cit.*, p. 838), and if we add to it what he supposes to happen during the ionisation of gases, viz. "that the normal process of gaseous ionisation consists in the detachment from an atom of the gas of a minute particle called a corpuscle" (Whetham, *op. cit.*, p. 156), one may regard the throwing off of the polar bodies as an ejection of ions on the part of the approaching spermatid and oöcyte, making them gametes, until a condition of opposite charge occurs; we then get attraction between them, *i.e.* fertilisation.

In all the mitotic and maturation changes we get a microscopical representation of what happens in the electrical changes used by the physicist when electrolysing fluids or gases.

As the gamete and zygote heredity cells form a cycle, we may now summarise as follows:—

As already explained, the zygote has early set apart in it a portion, termed the primitive germ-cell mass: from this the heredity cells (primitive germ and sperm cells) arise, and these give rise in the sex glands to the oöcytes and spermatids. By maturation the heredity cells become gametes and the zygote arises from their union.

What is to be specially studied under this head is the question of what happens when the formation of the primitive germ-cell mass is followed by that of the heredity or primitive germ and sperm cells. In the human embryo the primitive germ cells have been found in the endoderm, travelling towards the Wolffian ridge (Ingalls). The heredity cells are due to a multiplication and probability distribution of the determinants of the zygote.

therefore a distribution of these by the law of probability among the heredity cells. The one set apart for the soma of the adult the zygote gives rise to, receives afterwards in its Wolffian ridge the heredity cells whose origin has just been given from the p. g. c. mass, and thus the entire individual expresses in its *soma* the result of one Id.* of determinants and in the *sex glands* many thousands of divided Ids. (see p. 14), each oöcyte and spermatid containing an Id. or fraction of an Id., but lacking the power of developing somatically. As all these processes happen according to a probability law, variation in the determinants of the heredity cells is the result and we thus get an explanation of the well-known biometric fact that measurements of organs[†] in the adult give a frequency polygon. This shows the far-reaching nature of the work of biometricians.

Thus in the heredity or primitive germ cells we have a probability distribution of all the multiplied determinants of the zygote, excepting that part set aside for the "soma" of the plant or animal, which, of course, has also had its probability Id. allotted to it. Thus arises the variation of progeny and also another important consideration. Children always vary from their parents, and the parents do not transmit some of the qualities they possess. Genius, for instance, is not again distributed. A simple deduction from what has gone before helps us to understand this. We may suppose that in the zygote giving rise to a genius there has been an unusually large distribution of those cerebral determinants connected with genius, and thus the great poet, artist, or scientist. There would, therefore, as a corollary, be less of such determinants for the probability distribution in the primitive germ-cell mass giving rise to the heredity cells in this man of genius. In heredity, there is not only transmission but also distribution, and therefore the extra amount put into the somatic Id. of the zygote in a genius leaves less for his p. g. c. mass, and therefore for his progeny. The determinants in all the Ids. in an adult (somatic and propagative) vary, and the chance of equivalent Ids. in single heredity cells is so minimal as to be yet unknown. The chances of the child being the same as its parent in every respect are negligible; parents give rise to a variation progeny, a fact of a disappointing nature to many anxious and able fathers and mothers.

Mitosis, maturation, and the formation of the heredity cells are

* Whether the Id. of the heredity cell is equivalent to that of the somatic part of the zygote is not yet settled. Probably the somatic Id. has something in it, as yet unknown, determining its somatic development.

† The measurable elements of an adult organism.

variation phenomena, give results summed up by the law of probability, and are in their action governed by the electrical mechanisms so intimately bound up with molecular distribution.

Action of Internal Secretions.—Finally, an interesting question arises as to the possibility of internal secretions inducing mitosis, i.e. setting up electrical attractions and repulsions by their stimulus. From what has gone before it may be a purely physical action, that is, an internal secretion so stimulates the neutral molecules that by the loss of electrical atoms owing to their increased whirl they become positive and negative ions and thus we get the attractions, repulsions constituting mitosis, or in sperm and germ cells the ejection of masses of ions constituting maturation. Beard made the very interesting observation, without comment, that when the primitive germ cells of elasmobranch embryos were travelling through the germ path (Keimbahn) their nuclei were not undergoing mitotic changes. This goes on, however, markedly, when they pass into the genital ridge, and presumably it may be an internal secretion, afterwards the ovarian secretion or hormone, which is the cause of the interesting mitoses of the oocytes there.

We now go on to apply the previous statements to the question of the *sex-ensemble*.

16. SEX PHYLOGENESIS AND THAT OF THE SEX-ENSEMBLE MUST BE STUDIED TO EXPLAIN THE ORIGIN OF THE HEREDITY CELLS AND DERIVED GAMETES AND THAT OF THE DUCT PORTION OF THE GENITAL TRACT.

In now summing up the evolution of the *sex-ensemble* we have to recall the phylogensis of the heredity cells (primitive germ and sperm cells) giving rise to the gametes as well as the phylogensis of the duct elements in the urogenital tract (Wolffian and Müllerian duct derivatives); also the phylogensis so far as known of the urinogenital sinus and external genitals.

Of these the phylogensis of the heredity cells and gametes is by far the most ancient, going well back into fossil times. The duct elements have a much shorter ancestral line, reaching only to the organisms with nephridia (annelides), although these, of course, have their forerunners, but these duct elements are mere parvenus compared with the heredity cells.

We have thus to consider (*a*) the phylogensis of the heredity cells and gametes; (*b*) the phylogeny of the pronephros and mesonephros and of their ducts.

(*a*) *The Phylogensis of the Heredity Cells and Gametes.*—The

special question that arises under this is what view one is to take of an elementary unicellular protozoon like the amoeba, such, for instance, as the amoeba crystalligera (see p. 14 for zygotic origin of heredity cells). We may regard it as an organism equivalent to a primitive germ or sperm cell—a heredity cell—motile or non-motile and placed in an external environment, *i.e.* outside the soma of an organism.

While, at first sight, an extremely simple cell, it has by no means an elementary organisation, but performs a great number of functions and is of a most complex chemical constitution. According to the opinion of a friend, an expert in physiological chemistry, we may regard living protoplasm as “an aggregate of highly complex organic substances of a colloidal nature (such as proteins and lipoids and other substances of unknown chemical constitution, which have the power to act as catalysts), and of inorganic electrolytes which are partly kept in a state of adsorption by the colloids, the whole of which is surrounded by a semi-permeable membrane constantly undergoing chemical changes.”

It can perform all the functions of the highest organisms, *viz.* reproduction, metabolism, phagocytosis, excretion, formation of internal secretions, of powerful irritants or toxins in higher but still elementary organisms, and possesses power of locomotion, injection, ejection of excreta.

Even specialisation of function has begun, as “in a flagellate protozoon called euglena a pigment spot exists near the anterior end,” probably an eye spot (Washburn, *The Animal Mind*, p. 122). It has perhaps an elementary mind. Its physical structure may be regarded as made up of neutral molecules with positive and negative ions, and either as purely electronic or as electrically charged protoplasm, *i.e.* protoplasmic and electronic.

It is thus quite a misnomer, therefore, to speak of the “simple” protozoon. It is rather a profound and elemental complex, and has the greatest mystery of all phenomena—life.

Its reproduction may take place by amitosis (F. E. Schultze and Schaudinn) and also by mitosis. The former Schaudinn speaks of as being demonstrated “ausser Zweifel.” He made some of his observations on amoeba crystalligera, and found there direct division going on as F. E. Schultze had already demonstrated in *A. polydora*.

In *A. binucleata* Schaudinn found mitosis taking place, and figures the stages of spindle formation.

An important section of Schaudinn's work is in relation to the

copulation of *Actinophrys sol* (Ehnbg.). In this, as Pl. V., Fig. B., shows, we have nearly all the mitotic and maturation changes described, in the maturation and fertilisation changes of higher organisms, *i.e.* in *ascaris megalocephala*. We can note the junction of two equivalent amoebæ—(1) their encystment and double condition; (2) with the chromosomes in the skein condition (Knäuelbildung); in (3) the formation of the prophase stage; while in (4), (5), and (6) we see the formation of the polar bodies and their ejection.

This is equivalent to a real fertilisation, leads to a variation in two similar organisms, and shows us that basally the aim of fertilisation is "variation." The determinants in the chromosomes become varied, and the ejection of the polar bodies, a "mutation," gives a more marked variation. The amoebæ *sol* engaged in copulation here are similar organisms, and therefore "sex" is not present.

The succeeding stages in the development of sex may be hypothetically sketched as follows:—The copulation of a non-motile and flagellate protozoon would be the next important stage, and this would begin sex, as they would give motile and non-motile gametes. When such protozoa formed colonies we might then get the penetration of ciliated and non-ciliated organisms into such a colony, and they might be fixed in some certain situation by a "hormone." This would lead to the formation of a hermaphrodite sex gland, and as the heredity cells would be derived from the ciliated and non-ciliated heredity cells in the indifferent sex gland, a hermaphrodite condition would arise in the organism, *i.e.* it would have ciliated and non-ciliated heredity cells.

As one passes up the scale of life the hermaphrodite condition would be eliminated. Even in organisms where this is actually present, it falls into abeyance, but ultimately the most stable and effective condition would be that where one organism, male, had motile heredity cells produced in abundance, and necessarily in tubuli, which when shed went in search of the egg produced in a follicle. Hermaphroditism leads to inbreeding and degeneration from a small range of variations, whereas sexual reproduction, from its greater power of variation, would give stronger offspring. The condition of certain abnormal fishes and frogs where a hermaphrodite condition frequently exists, shows the process of elimination of hermaphroditism still lingering. In the mammalia, finally, all hermaphroditism is gone, but there is no reason, theoretically, why heredity cells, male and female, might not appear in a sex gland.

This has never been satisfactorily demonstrated, as all alleged ova in the so-called ovo-testis in mammals are probably isolated sections of tubuli seminiferi in a defective male. The organ is really a defective testis.

The heredity cells in mammals are thus descended from elementary protozoon organisms which have become embedded in another organism, and under the influence of hormones, in special sex glands. The gametes are derived from the heredity cells by ejection under the same molecular and electrical processes seen in the ionisation of gases.

(b) *The Phylogeny of the Pronephros and Mesonephros and of their Ducts; Origin of the Opposite Sex-Duct Elements.*—In the human mammal the Wolffian bodies are prominent in foetal life only up to the second month. They are of the greatest importance, not only because of their excretory function, although this is denied by some, but also from the fact that the sex-glands develop on them and in the male, part of the tubules become tubuli seminiferi, while the Wolffian duct becomes the vas deferens.* The female potent tract arises from the Müllerian ducts mainly. In the female the parts giving rise to the male epididymis form the degenerated epoöphoron with its short duct, and the paroöphoron, the opposite sex-duct element, but the lower end becomes the hymen, a functional structure. In the male the opposite sex-duct elements are the hydatid testis and the prostatic utricle. *The evolution of the duct portion of the urogenital tract of mammalia is, in the female, a progression from a complex condition to a simple one*, and the object of what follows is to show how this change takes place. Briefly, it may be summed up as follows:—

It has been already shown that in the human female we have in the urinogenital tract exact losses leading to deformities, or, in a broad sense, to variations. In a typical *sex-ensemble* we have an arrangement of the duct portion characteristic of the sex, and also an opposite sex-duct portion degenerated and imperfect. This I suppose to be due to its losses in the past at maturation while in the determinant stage, when the polar bodies are thrown off, and thus a probability and working arrangement is brought about.

The urogenital system has autonomous determinants for it in the somatic part of the zygote; these are expressed in the typical tract by unit characters or segments, and thus we can reckon out how many unit characters make up the system and what polar

* The development of the testis still requires much elucidation.

losses lead to the ultimate ratio between the potent and opposite sex-duct elements in typical sex.

We must, therefore, first attempt to fix what might be the possible segments in the potent and opposite sex-duct structures in a typical human mammal, basing this on the results of the exact losses in the atypical urogenital tract. This has been already done in the typical human genital tract, and I have taken them tentatively as follows:—Human female genital tract, potent, 40; non-potent, 4. In the male it is—potent, 27; non-potent, 6 (*vide* p. 32).

17. NUMBER OF UNIT CHARACTERS IN LOWER MAMMALS.

If we now go back to the lowest mammals—the monotremes—we find an unsatisfactory state of knowledge as to the urogenital tract, especially as to the opposite sex-duct elements, and Professor Anderson Stuart of Sydney tells me that this element has not as yet been worked out by Australian anatomists. I therefore go on to the

Marsupialia.—In the marsupialia I examined the genital tract in the female rat-kangaroo microscopically and serially, and found, *inter alia*, the epoöphoron well developed. The genital tract in the female rat-kangaroo is complex and made up of the following elements:—*Potent*—Ovary, 2; tube, 6; bicornuous uterus, 4; Müllerian portion of vagina, usually blind below, 2; urinogenital sinus, 2; Wolffian portion of vagina (lateral canals), 2. *Non-potent*—Epoöphoron, 2.

This gives 18:2 as the potent and non-potent ratio, but I do not insist on it, as much work remains to be done here.

The other orders of the mammalia should now be considered relative to their *sex-ensemble*, so that they might be compared with that of the normal human male and female. This, however, cannot be done at present, chiefly owing to our deficient knowledge of the opposite sex-duct elements present, but it is to be hoped that in time the innumerable gaps in our knowledge will be accurately filled up. There is, however, the same ratio tendency in these, but the potent are fewer in number, the non-potent greater, with the preponderance in number of segments always greater on the potent side. If the human female genital potent and non-potent ratio is 40 potent to 4 non-potent, then in the other members of the mammalian phyla we may expect a 39:5, 38:6, 37:7, etc., ratio of potent and non-potent organs, and thus establish a ratio table to be filled up by future investigators. The same may be found in the male genital tract, but our ignorance on these points in this sex is colossal.

18. SUMMARY.

Sex is established early in phylogeny by the formation of gametes from primitive germ and sperm cells, i.e. flagellate and non-flagellate, protozoa outside an organism; then follows their lodgment in an organism and ultimately in its sex gland.

The human potent genital-duct tract and the opposite sex-duct elements constituting with other structures the typical sex-ensemble have a maximum-minimum, i.e. probability relation, due to successive polar body losses of the autonomous determinants causal to adult results at maturation, and are recorded in the germ plasma (Mendel).

Natural selection eliminates ineffectual results, and thus a stable condition of the sex-ensemble is reached.

Under this heading must be summed up the views as to the nature and determination of sex, and the *sex-ensemble* of which the foundations have been laid in the preceding pages.

Sex is regarded as due to the nature of the heredity cells. Any metazoon with motile heredity cells is male; with non-motile ones it is female.

One must distinguish between *sex* and *sex-ensemble*. The latter has not only the sex gland but the genital ducts according to the sex, i.e. the Müllerian ducts, part of the urinogenital sinus, the external genitals and secondary sex characters, viz. fully developed mammae, special type of pelvis, hair distribution, etc., in the female, while in the male there is the testis as sex gland (descended), the vas deferens, the prostatic utricle, external genitals with the secondary sex characters, mammae (rudimentary), pelvis, hair distribution. Further, as part of the normal *sex-ensemble* we have a minimum of opposite sex-duct elements, a most necessary feature of the normal or typical *sex-ensemble*, inasmuch as any increase of this minimum necessarily has a diminution of the potent and characteristic tract, and therefore an atypical form of sex arises—what is usually but erroneously described as pseudo-hermaphroditism.

We may regard the typical protozoon as a primitive germ or sperm cell, leading an independent existence, as made up of protoplasmic molecules with some free ions, and these, as already described, are to be considered as made up of electrons and, according to their electrical condition, as neutral molecules and positive and negative ions. In the first the positive and negative charges are balanced, while in the negative ions there is an excess electron (or atom of electricity), and in the positive a loss of an electron. The neutral molecules have, however, a constant whirl in them, and thus by loss of electrons become ions.

We may leave out the question of the significance of mitosis in protozoa and take up the behaviour of the protozoon when its molecules are negatively and positively charged and are regarded as ions. In the electrical whirl of the electrons of the molecules we get an ejection of electrons as in ionised gases, and thus the formation of gametes by the loss of the polar bodies in the approaching heredity cells.

In *Actinophrys sol* (Pl. V., Fig. B.) we have a copulation of similar organisms and all the phenomena of fertilisation. This copulation is for the production of variation, and is the first step in the production of sex. We may then imagine the union of a ciliated and non-ciliated protozoon as the next stage. The organism this gave rise to would in like manner form ciliated and non-ciliated gametes.

When such a hermaphrodite protozoon entered a colony of protozoa and became locally fixed, the sex gland would be established, and necessarily with both sperm and germ cells—a true hermaphrodite condition.

In such organisms it is known that self-fertilisation gives rise to degeneration and fertilisation is ineffective. In flowers, for instance, self-fertilisation may be prevented by local arrangements or by difference of ripening of the male and female elements. Natural selection would then act and cross-fertilisation by insects become effectual. There would thus be a tendency for the heredity cells in an organism to become of one kind—male or female. The hypothetical sketch of the origin of primitive sex by the passage of hermaphrodite protozoa into a protozoon colony and their establishment locally and ultimately in a higher organism as a sex gland is consonant with Haeckel's law.

In higher animals, fish, amphibia, mammals among others, the heredity cells formed by an early division of the zygote pass through the developing somatic part of the zygote and establish themselves in the genital ridge of the Wolffian body to form the sex gland. The heredity cells passing in would in far-back organisms be of both kinds—male and female, and in so-called hermaphrodite frogs and fishes we have instances of imperfect previous elimination. From all this it follows that sex, defined by the nature of the heredity cells, arises far back in phylogeny, and is produced by the molecular reduction of these under special electrical conditions in two kinds of protozoon organisms characterised by the contrasted conditions of activity and passivity—on which Geddes and Thomson base so much under the terms anabolism and katabolism.

The question of the establishment of the potent sex duct and opposite sex duct or non-potent elements in mammalia must now be summed up. This is an important element in the urogenital system, and while sex cannot be defined from their existence the *sex-ensemble* is not typical unless the non-potent is present in a minimal condition. In the typical *sex-ensemble* the opposite sex-duct element must only be represented to such an extent that it does not deprive the potent part of the tract of segments necessary for the exercise of its full functions. What we know of its exact amount is still far from complete, but the following sketch of the potent and non-potent elements, so far as it is yet known, is as follows:—In the mammalia we find in *marsupials* the bicornuous uterus and a remarkable condition of the vaginal tract. In it we have the lateral canals well developed, opening above into the Müllerian vagina and below into the urinogenital sinus. The lining of each is a multiple squamous epithelium like that of the human vagina, and these lateral canals, which are, I believe, the Wolffian ducts, probably conduct the spermatozoa into the upper part of the Müllerian vagina, and thus to the uterus.

The central portion of the vaginal tract is usually a pouch, blind below but open above. This central portion is lined with a single layer of columnar epithelium. In some species the central pouch opens below into the urinogenital sinus (Bennet's kangaroo). Sexual congress is thus accomplished, so far as the female is concerned, by intromission of the phallus with the urinogenital sinus, but in Bennet's kangaroo the central or Müllerian portion is also concerned.

Whether in the cases of the kangaroos with the blind Müllerian pouch, birth of the small fetus is accomplished through the lateral canals or whether the blind portion yields at its tip so that the fetus passes from it into the sinus (J. P. Hill) is not yet determined. The vagina of the *human female* is Müllerian in its upper two-thirds, the lower third being derived from the urinogenital sinus, and thus in the kangaroo these two elements are separated and not blended as in the human female. As we pass up the mammalia we get the Wolffian duct element more or less eliminated, and thus the human vagina becomes a single canal with the Wolffian duct element much less represented. In the cow and sow it is represented in the vaginal tract by a narrow tube (Gartner's canal): this is less represented in sheep (Numan), but in other mammals its exact representation is almost completely unknown.

From what has been said of the segmental condition of the urogenital tract and of the significance of the polar losses, we may regard the human genital-duct tract as the result of a series of polar body losses in lower mammals until an ultimate probability result giving a maximum of potent and a minimum probability result ensues. Any increase of the latter would lead to a diminution of the potent organs, what lies at the root of the question of atypical sex (pseudo-hamaphroditism).*

From what has been said as to the essentials of Mendelism, it is evident that in the establishment of a variation by a maturation loss, pure in the heredity cells while other cells exist which are not pure to this loss, we get ultimately a pure result in certain cases, and the occasional occurrence of undistributed results giving older forms of the tract.

For the many hundred theories of sex Thomson and Geddes and Beard may be consulted.

Recently special attempts based on Mendel's theories of dominance and recession have been made by eminent observers to settle the origin of sex at fertilisation. Dominance and recession, however, merely express too strongly the fact that in an ordinary plant crossing where two contrasted qualities are present, one is alone expressed in F^1 , *i.e.* it is the first of the two qualities to be expressed in the plant soma. In succeeding generations both contrasted qualities are expressed in a probability ratio in the plants because their determinants have been distributed in a probability ratio in the pollen grains and egg cells of F^1 . Dominance and recession do not therefore apply after the F^1 plants, and have not the significance usually attached to them. Indeed a careful study of the results obtained as to sex by these investigations leaves one in the position of the scholastic student of old who plaintively said of his arid studies—

“Myself when young did eagerly frequent
Doctor and saint, and heard great argument
About it and about; but evermore
Came out by the same door wherein I went.”

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* This passage from a complex condition to a simple one by successive losses is illustrated in many other conditions in mammals, especially in the fossil predecessors of the horse, when the multiple digits in the legs are eliminated, and ultimately represented in the modern horse by the single bones well known to all.

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ANAPHYLAXIS AND STATUS LYMPHATICUS: THEIR RELATION TO INTENSIFIED TYPES OF DISEASE IN INFANCY AND CHILDHOOD.

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II.

THE RELATION OF ANAPHYLAXIS TO STATUS LYMPHATICUS.

THE second proposition made at the outset of this paper was that some connection existed between the morbid constitution or

diathesis termed status lymphaticus, and the anaphylactic state. The following facts seem to support it:—

The cases of fulminant pneumonia and of scrofula, the subject of previous papers, have just been viewed from the standpoint of anaphylaxis. They certainly exhibit various definite phenomena of hypersensitiveness. In the previous papers it was also shown that they exhibited the definite marks of status lymphaticus.^{1 2}

Cases of "immediate" reaction to antitoxic horse serum are accepted without question as extreme examples of human anaphylaxis. A few of these cases have been fatal. The death of the son of Professor Langerhans of Berlin immediately after a hypodermic injection of diphtheria antitoxin is now quoted in the literature as a case of anaphylaxis. But in the literature of status lymphaticus it has been and still is quoted as a case of status lymphaticus. M'Keen¹⁴ has reported in a girl of seventeen this same association of status lymphaticus with rapid death after injection of diphtheria antitoxin.

In fatal cases of eclampsia, which is now generally regarded as an example of anaphylaxis, Hedinger¹⁵ declares that the condition of status lymphaticus is frequently shown at the autopsy. There is therefore some support for the hypothesis that this conjunction of thymo-lymphatic hyperplasia with cases of illness showing anaphylactic phenomena indicates some connection between the two conditions.

The Anaphylactic Diathesis.—Our knowledge of the nature of the two conditions—anaphylaxis and status lymphaticus—is still unsubstantial. As to anaphylaxis, animal experiment has now furnished some definite facts. The changes wrought by the first injection of serum are widespread, but so subtle as to elude chemical and histological analysis. Yet these changes have been effected in the cells of many organs and tissues, and are now inherent in these cells and independent of nervous influence.^{16 11} This cellular change is truly an alteration of constitution; it is correct to call it a morbid constitution or diathesis. The evidence of this perverted constitution is only shown by the very abnormal and hypersensitive reaction of one, several, or many groups of body cells to a repeated injection of the original substance.

The Lymphatic Diathesis.—With regard to status lymphaticus, the extent of our knowledge is even smaller. As in anaphylaxis, there is apparent pre-existent good health, and then a sudden and entirely unexpected death. Post-mortem examination shows only a thymo-lymphatic hyperplasia, and the diagnosis of status lymph-

aticus gives no further explanation of the cause of death. But the predominant view of its pathology (that of Paltauf) is that the lymphatic hyperplasia has nothing to do with the mechanism of the sudden death-blow, but is only a mark of some pre-existing abnormal constitution in which the vital organs are immediately and fatally deranged by quite trivial causes.¹⁶ So that in status lymphaticus, as in anaphylaxis, pathologists have adopted the same doctrine of a subtle constitutional change in the various cells of the body, which remains concealed until the catastrophe takes place.

Thyroid Hyperplasia and Status Lymphaticus.—It has already been shown¹ that thyroid hyperplasia, generally of an extreme degree, regularly accompanies the condition of thymo-lymphatic hyperplasia, and the suggestion has been made in the same paper that thyroid hyperplasia may be an equally important mark of the unknown constitutional condition, status lymphaticus. It is important to remember that both the thyroid and the lymphatic hyperplasia have been present for some time before death, and it is difficult to imagine that either of them is an immediately active factor in the production of death.

The question of what is the cause of the thymo-lymphatic hyperplasia has often been debated, but no clear answer has yet been given. But thyroid hyperplasia is a comparatively new fact in the pathology of status lymphaticus. Can it be interpreted, and can its interpretation throw light upon the problem?

Farrant¹⁷ has shown that in common infections of childhood—measles, whooping-cough, diphtheria—hyperplasia of the thyroid occurs regularly, and is proportional to the duration of the illness. McCarrison¹⁸ produced goitre—a sequel of hyperplasia—in man by the drinking of unboiled contaminated water. Experimentally, thyroid hyperplasia can be produced in animals by injection of a great variety of bacterial cultures. From these results can the generalisation be made that thyroid hyperplasia is an index of the existence of some form of toxæmia; or, more broadly still, of the presence in the blood of unsplit (undigested) protein of any kind?

If that is accepted in the meantime as a provisional hypothesis, the next statement to be made is that thyroid hyperplasia is not produced by the direct action of the foreign unsplit protein, bacterial or otherwise, upon the gland; the effect of the toxæmia is produced upon the body cells, and the thyroid hyperplasia is an indication of their disturbed nutritional and metabolic conditions.

That view of thyroid hyperplasia is held by Marine and Lenhart,¹⁹ who have made a very complete study of the subject in man and animals.

Upon these hypotheses of thyroid hyperplasia we are now in a position to build an explanation of "fulminant" types of bacterial infection. For example, in a case of fulminant pneumonia in a baby found dead in bed, or in the much rarer cases of pneumonia in older children dying unconscious and cyanosed in a few hours, the extreme thyroid hyperplasia may indicate a previous "toxæmia" which has disturbed and highly exalted the normal irritability of the body cells to the virus of pneumonia. The ordinary symptoms of the onset of pneumonia represent a normal anaphylactic reaction: the intense symptoms of a fulminant case correspond to the "immediate" reaction in serum disease, and may well be due to the heightened *anaphylactic reaction of the same groups of body cells whose irritability has been intensified by some protein "toxæmia."* *

Up to this last point the argument seems to have support in facts. But this last assumption, that the thyroid and thymo-lymphatic hyperplasia is the mark of perverted metabolism produced by some unknown toxæmia, may appear an entirely abstract speculation. Yet there seems to be a little material evidence in support of it. Duncan²² has reported, in an industrial school, cases of fulminant pneumonia, of the same character as those described in this and previous papers as institutional pneumonia. They, too, were accompanied by the morbid anatomy of status lymphaticus. From the organs of one of the fatal cases a motile bacillus, belonging to the coli-typhoid group, was isolated, which was agglutinated by the serum of other boys in the school, some of whom had suffered and recovered from illness like that of the fatal cases, while others had been unaffected. Agglutination reactions were not tried in the school near Edinburgh; but if an opportunity should offer itself it would be highly interesting to do so.

This last suggestion, that the thyro-thymo-lymphatic hyperplasia, associated with these cases of institutional fulminant pneumonia, indicates some toxæmia (in the broad sense of some unsplit protein circulating in the blood), must, however, remain in the meantime hypothetical. But it may be claimed that there

* A connection between the thyroid and the anaphylactic reactions in serum disease is suggested by Hodgson's results of administration of thyroid in cases where diphtheria antitoxin had been given. The number of cases of serum disease was much reduced.²⁰

are more solid grounds for the proposition that the anaphylactic state and status lymphaticus are connected. If the premise that the ordinary reaction of the body to the virus of pneumonia is anaphylactic be accepted, and also that increased degrees of anaphylaxis occur, then it seems a just conclusion that the explosive reaction of the body in fulminant pneumonia is such an intensified reaction. In that case the regular accompaniment of the accepted marks of status lymphaticus in these cases, and the various records of the same condition in fatal cases of serum anaphylaxis, strongly suggest that the two conditions are related. *Status lymphaticus may be said to be a condition of body in which anaphylactic phenomena occur, not in the ordinary, but in an intensified, degree.*

The same general facts are true as to the relation of cases of scrofula (hypersensitiveness to tuberculous infection) to status lymphaticus,² and the same general deductions as to their anaphylactic nature are permissible.

OTHER EXAMPLES OF ANAPHYLAXIS IN CHILDHOOD.

The third proposition, that intensified types of other illnesses in infancy and childhood occur, and can be interpreted in the same way, need not be dealt with at length. The same association of conditions—thyroid and thymo-lymphatic hyperplasia, and intensification of morbid phenomena—are present, and if the deductions are valid in the cases already dealt with, they will hold good here too.

Daut²² has reported the association of status lymphaticus with a series of cases of fulminant diphtheria. McGowan and myself¹³ have recorded a similar association in malignant scarlet fever. I have collected a series of rapidly fatal illnesses in infants and older children, which I hope to publish shortly. In all of these status lymphaticus was present in marked degree, and in the majority the actual cause of death was a gastro-enteritis, producing an altogether abnormal and distorted clinical feature. It seems very probable that cases of fulminant measles, smallpox, appendicitis, certain intense local inflammations and ulcerations in children, as, for example, varicella gangrenosa, will also be found to exhibit the phenomena of status lymphaticus, and to be explained by the conditions of hypersensitiveness or anaphylaxis.

A few detached points remain to be considered. Anaphylaxis is a special manifestation of irritability to foreign bodies by normal cells. It seems certain that with a large number of irri-

tants there is also a large variety of anaphylactic reactions. For example, many tissues of the guinea-pig, including non-striped muscle, are sensitised by horse serum, but the same animal shows no sensitisation of its non-striped muscle when tuberculin is used.²⁶ But if anaphylaxis varies in kind, it also varies in degree. And here we seem to have the explanation of the peculiar types of bacterial infection in infancy and childhood. The tissues and cells of the young animal, with their more active metabolism, react more sharply than those of the adult when the factors producing anaphylaxis are present. For example, is it not possible that the predominance of lobular as opposed to lobar pneumonia in young children is due to a different reactive faculty of the affected tissues?

But over and above this *natural exaltation of anaphylactic phenomena in childhood* there remain the extreme examples which cannot be explained entirely by this special age-constitution of the body—the cases of fulminant pneumonia and gastro-enteritis in infants found dead, and the similar cases of a few hours' duration in older children. It is these cases which show the morbid features of status lymphaticus, and the cause of this extreme hypersensitiveness of body is still undiscovered. Cornet has called the scrofulous constitution "embryonalism" and "increased infantilism"; but the term might, with fitness, be applied to all those cases in infants, children, and, in a few rare cases, in adults, where the phenomena of hypersensitiveness are shown at this highest pitch of intensity. The subject of status lymphaticus includes all those various cases—sudden death, fulminant acute infectious diseases, scrofula, immediate serum reactions—and the problem of status lymphaticus will not be solved until the cause of this *super-hypersensitiveness* is discovered. The phrase "*increased infantilism*" seems in the meantime a fairly accurate description of them, for they exhibit phenomena of hypersensitiveness greater even than those shown by the highly sensitive body cells of infants.

Status Lymphaticus and Health.—Of late, the existence of status lymphaticus as a morbid entity has been denied, because the condition has been found occasionally in the bodies of apparently healthy persons killed by accident. But the objection is not difficult to meet. The classical cases of status lymphaticus, that is, sudden death without symptoms of illness, notably occur in individuals showing previous good health. All individuals with this tendency to sudden death need not, and do not, die in

this way; it is quite natural that some of them should be cut off by violence* or accident; it is possible that others may survive and lose this morbid diathesis.

It is further objected that the morbid anatomy of status lymphaticus is normal in infancy and childhood. Evidence of this has never been offered. I am collecting post-mortem data on this point, but my material is not yet large enough to make a definite statement. But, so far, the evidence points in quite the other way. Excluding the question of thymus enlargement, it is very uncommon to find, in a variety of typical diseases in childhood, that hyperplasia of the lymphoid tissues of the duodenum and ileum which is so marked a feature in cases of status lymphaticus. *Wherever that lymphoid hyperplasia has been found, the clinical picture of the illness has not been the ordinary type, but has been extraordinary in its intensified and distorted character. When a series of cases of illnesses in childhood that have run a normal course are shown to exhibit post-mortem the features of status lymphaticus, then, and only then, will cases of sudden death or of intensified types of disease, fatal and non-fatal, be proved to be independent of the thymo-lymphatic hyperplasia that so regularly accompanies them.* So far this critical test has not been established.

Bacterial Virulence and Violence of Reaction.—The suggestion has been made in the course of the paper, and some evidence offered in support of it, that in many so-called "fulminant" or "malignant" types of disease the morbid agent is not specially active or powerful but that the body exhibits an explosive and self-destructive resistance to it. But though attention has been directed chiefly to the body's reaction, the fact of variation in the strength and activity of the morbid agent is not denied for a moment. But of the two factors at work, the living virus and the resistance of the living body, the latter has been too much neglected. The great interest of these fulminant types of disease, local and general, discussed in this paper, is that they seem to belong to the group of anaphylactic phenomena. They are clinical illustrations of these astonishing freaks of experimental biology in which the body has been so highly tempered in its sensitiveness that violent explosive reactions are produced by extremely small amounts of active substance. They are called *malignant*, or *fulminant*, or *toxic*; but it is the reactions that are so, while the causal viruses need not be highly potent, and

* The body of Willie Starchfield, recently strangled in a railway carriage near London, showed the condition of status lymphaticus.

may, indeed, be weak.* A small spark can fire a powder-barrel.

CONCLUSIONS.

It will be well to collect into a brief series of statements the conclusions of this and the preceding papers.

1. Fulminant types of bacterial infections in childhood, both acute and chronic, are accompanied by the accepted marks of status lymphaticus, that is, thymo-lymphatic hyperplasia. The great majority of cases of sudden death (classical status lymphaticus) are in reality very extreme fulminant types of bacterial infection, usually broncho-pneumonia or gastro-enteritis.
2. *These intensified types of disease are examples of exaggerated anaphylaxis.* If the ordinary onset of pneumonia represents a group of anaphylactic reactions, the onset of fulminant pneumonia is only a higher degree of the same biological reaction. Accepted cases of anaphylaxis show the same scale of gradation, for example, from the ordinary to the immediate reaction in serum disease. Thus fulminant pneumonia corresponds to the immediate reaction in serum disease; both are examples of exaggerated general anaphylaxis.

The intensified cutaneous reactions in scrofula are obviously types of exaggerated local anaphylaxis, while the ordinary cutaneous reaction in non-scrofulous tuberculosis represents the ordinary degree of local anaphylaxis.

3. The relation of status lymphaticus to anaphylaxis must be carefully defined. It may be briefly put as follows:—*Status lymphaticus is an abnormal condition of body (morbid diathesis) in which, if anaphylactic phenomena occur, they do so in an exaggerated way.* The variation in degrees of anaphylaxis is to be explained by the variation in degrees of irritability on the part of the cells of the body. The highest pitch of anaphylaxis is seen where the body cells have attained a maximum of irritability: that condition of body is status lymphaticus.
4. Thyroid hyperplasia regularly accompanies thymo-lymphatic

* There is no doubt that many cases of pneumonia, sporadic and epidemic, are truly malignant in the sense that the virus is highly potent. The term *malignant* might be reserved for them, while the word *fulminant* seems a correct and fitting term for the special cases of pneumonia dealt with in this and previous papers.

hyperplasia. It deserves to be regarded as an important mark of the abnormal condition of body status lymphaticus. The interpretation of thyroid hyperplasia may throw light upon the cause of status lymphaticus. It is certainly pre-existent before death, and before the operation of the cause of death. From analogy of other instances of thyroid hyperplasia, where the cause of this is known, the hypothesis may be advanced that *in status lymphaticus the thyroid hyperplasia reflects and indicates an abnormal condition of the body cells produced by the prolonged action of some toxin, bacterial or otherwise.* This intoxication may, in some cases, be congenital, being transferred from mother to foetus (just as is anaphylaxis), or acquired. The duration of its effect upon the body cells need not be discussed; but there is no necessity to regard it as a permanent change.

In concluding this paper I must express my special thanks to Professor Ritchie, who suggested to me that these cases of institutional pneumonia with sudden death might resemble cases of death from anaphylactic shock, and who has, therefore, provided me with the basis of discussion in the present paper.

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HABIT AS A PATHOLOGICAL FACTOR.

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"PATHOLOGY" is a name which has been somewhat loosely applied to biological processes which are abnormal or unusual. A departure from the norm, however, is not necessarily something which has to be combated. Thus inflammation, though included under the heading of *pathology*, is a quite right and proper process in so far as it proves effective.

If we wish to understand the behaviour of any part of an organic system (let us say, the behaviour of an organ, a tissue, a cell, or even of an "organism" in the usual acceptance of the term), we must not merely consider it as acting upon or being acted upon by its immediate present environment; we must consider also its original inheritance or "nature," and its individual past record or history. It is ultimately impracticable to look upon such an organic part as something isolated either in time or space; we frequently need, of course, to isolate it in theory for temporary purposes, but the particular point of view so gained can never of itself prove an adequate basis for efficient and comprehensive action.

Let me give two examples, one from physiology and the other from pathology. It is sometimes crudely stated that the human embryo, in its development, passes through a fish-like stage. Now, as a matter of fact, while an ichthyoid ancestral form is quite definitely hinted at, this has been so profoundly modified by the vast period of time during which it has existed under conditions (e.g., *in utero*) entirely different from those of its original occurrence, that to apply the term fish-like to it now is hardly relevant, and is apt to lead to misunderstanding. Next, to take a pathological example, the cancer-cell is often described as a harking-back to a primitive or ameboid stage in the racial history of the affected body-cell. While this reversionary element undoubtedly plays a large part in determining the novel behaviour of the cancer-cell, we must not forget that the differences in external conditions (of pabulum, pressure, etc.) between then and now must in themselves greatly detract from the completeness of the reversion.

If we consider an organism, an organ, or a cell, we are struck by the fact that each of these tends to develop a definite structure, as well as definite activities, external and internal, and to maintain

these, in the teeth of much opposition, throughout a definite life-cycle.*

Strictly speaking, no hard-and-fast line can be drawn between structure and function; the development and maintenance of its structure by an organism, organ, or cell is not essentially different from the more external and obvious activities which are ordinarily known as its functions. The popular opposition is, rather, between the anatomical or static and the physiological or kinetic aspects of a continuous series of processes. For practical purposes, however, we usually group these two aspects of the organism's life into *what it is* (its nature) and *what it does* (its functions). Its actual inborn characters—what it inherits from its parents—constitute its *nature*; what it does over and above this are its *functions*.† Whilst a cell or other living thing acts essentially

* "Now Hippocrates was the first among all physicians and philosophers whom we know, in that he was first to realise what Nature does (τα τῆς φύσεως, ἔργα): for Nature he has the greatest admiration; he sings her praises continually and designates her 'equitable'; he says that she by herself suffices for the animal in every respect, and that, of her own accord and without any teaching, she performs what is required. Being such, she has, as he supposes, a faculty for attracting what is akin and another for expelling what is foreign, and thus she nourishes the animal, makes it grow, and expels its diseases by crisis. And therefore he says that there exists in our bodies a unique concordance in the motions of air and fluids [σύμπτωια μα, σίρρωια] everything being in sympathy. According to Asclepiades, on the other hand, nothing is naturally in sympathy with anything else, all substance being divided and broken up into inharmonious elements and absurd 'molecules' (ὄγκοι, atoms)."—GALEN.¹

[N.B.—By Nature Hippocrates obviously meant what we should call the living organism itself.]

"The most salient fact is the correlation and control of all the manifold chemical and physical processes, so that a unified behaviour results."—J. ARTHUR THOMSON.²

"Living things behave, or exhibit behaviour; and when we say that they exhibit behaviour, we mean that they seem to have an intrinsic power of self-determination, and to pursue actively and with effort their own welfare and their own ends and purposes."—WM. M'DONOGALL.³

"What is the basis of vitalism? The answer is that the living being maintains itself as a whole in all its details of structure and function throughout the vicissitudes of its life-history, and is naturally perceived by us as a whole."—J. S. HALDANE.⁴

† The distinction is emphasised in ancient Greek medicine. Φύσις (nature) comes from φύσκειν, πέδωκεν, I am born, I am naturally, as *natura* itself comes from *nasci*; Galen, in his treatise *On Habits*,⁵ contrasts αἱ φῆσι καὶ τῶν σωματικῶν ἰδιότητες (lit. the *natural* characteristics of bodies) with αἱ δὲ ἐξ ἔθους γιγνόμεναι (those that come through habituation).

as a unity, all its activities are, under ordinary conditions, subordinated to the maintenance of the larger organism of which it forms part. This is one of the main considerations which we must keep in view if we wish at all adequately to understand the behaviour of any part whatever of an organic system.

Every cell of the body conserves its form during a more or less definite period; the actual matter of which the cell consists does not persist. The cell is constantly re-creating its own substance—for instance, building up its specific protein molecules from the relatively simple and non-specific amino-acids; similarly with its external form. The same thing happens in an organ composed of cells, say the liver. While this organ itself persists, its component cells are from time to time degenerating and disappearing, new ones being formed from division of the old.

This same phenomenon of self-maintenance which characterises the cell or the organ characterises also the organism as a whole. In the individual animal, despite the noteworthy local autonomy of parts, there is complete subordination of all of these to the central government. Cells, organs, and tissues all collaborate together to maintain the specific structural and other activities of the individual organism. The fact that an organism (or other organic part) tends to resist distortion, and to persevere in a definite line of activities, has been ascribed to a *vis medicatrix Naturæ*; this is, however, merely a name given to a special aspect of the organism's behaviour, and is not to be looked on as a "force" *per se*. The simple fact is that each organism tends to maintain such and such specific activities, and in ascribing the original causation of these, or their persistence, to any material "force," we introduce an unnecessary complication into the nomenclature.

In order to gain anything like a clear conception as to the causes of this behaviour on the part of the organism, we must, for example, begin with a careful analysis of its racial history: here we have to do with the principle of survival of past in present—the *Unconscious Memory* of Samuel Butler, the *Mneme* of Richard Semon.

The individual's "functions" in the more special sense of the term (*i.e.*, what he *does* over and above the mere repetition of ancestral activities) may, of course, be conceived as existing *potentially* in his nature—in his inheritance, that is. And not only his own future behaviour, but, in constantly decreasing though never actually ending degree, that also of his lineal descendants for all time to come, may be supposed to be repre-

sented in the fertilised ovum from which he himself develops. How this enormous potency can exist in a single cell—whether in its ultimate structural constitution or in some other way—we are quite unable to tell; the fact of its existence, however, is not open to dispute. Thus the zygote includes both the memory of the past and the promise of the future. The behaviour which comes naturally to a new-born child (*e.g.*, breathing, sucking, etc.), and which it is practically impossible to better by education, is behaviour which the child has performed so often before that the action has now become a “habit.” We may say, according to our fancy, that the child has done these actions when in the persons of its forefathers, or, if we prefer the terminology of the Buddhists, we may say that it has performed these same actions in former “births” or “incarnations.” Properly speaking, however, it is not this separate individual who has lived before; the immortal element is the germ-plasm which has been carried continuously through a series of generations or “bodies,” and which has been garnering experience at every stage of its long journey. Functions originally acquired “*de novo*” by man’s pre-human ancestors have, by repetition, become practically part of the organism’s “nature” (or store of inherited characteristics). This idea is recognised in the popular language, where we speak of certain habits becoming a “second nature” (thereby implying a previous or inherited nature). The individual thus during his lifetime does not confine himself to a slavish reproduction of the developmental, structure-maintaining, and other behaviour of his ancestors; that is to say, under ordinary circumstances he transcends his nature to a greater or lesser extent; for one thing his *milieu* is bound to be, so far, novel, and to this he has to effect a largely independent and original adjustment. Thus, he may be supposed to be from time to time materialising certain potentialities of his germ-plasm which have hitherto been entirely latent and unexpressed; or we may, perhaps, say that the germ-plasm itself, rather than the “individual,” is the originator of these new developments. If they prove serviceable, they tend to be repeated more and more frequently, not only during the life of this particular individual, but in subsequent generations; thus they gradually lose their spontaneity and become more automatically provoked; eventually they crystallise into characters or *habits** distinctive of new species.

* The Latin *habitus* (from *habere*, I have or hold) signifies something held or retained after acquirement. The corresponding word in Greek is ἕξις, from ἔχω, ἕξω (*habeo, habebo*). A bodily habit (ἕξις), according to Galen, is a

The living organism reacts as a whole: in so far as it fails to react to environmental impressions it is dead, not alive. In its effective and vital reactions the organism and its germ-plasm act as one: indeed, as already said, in the deepest and truest sense the organism may be considered one and the same thing as the germ-plasm. Variations on the part of the organism are, from this point of view, variations in the germ-plasm; here we have potentialities, hitherto merely implicit, evoked for the first time. It may be that certain latent capacities or aptitudes are stirred up and rendered more available—more ready to be evoked—in the processes of maturation or amphimixis: to this extent, at least, we may agree with the Weismannists. It seems, however, almost certain that, under healthy conditions, that unanalysable factor in biology—the organism—plays the chief *role* here, as in other vital processes; though it is much conditioned by material factors, it is not rigidly determined by them.

The more, then, a variation partakes of this vital or organismal quality, the more does it tend (if natural selection approves) to be inherited. It is not a question of how such individual variations may be carried to the germ-plasm; they belonged, as we may say, to the germ-plasm from the first; when they have been once evoked, their evocation will be easier a second time.

It is often said that actual structural alterations produced in the soma by its surroundings ("dents from without," mutilations, etc.) cannot be inherited; in so far, probably, as the net effect produced is of environmental origin, that is true; but in so far as it is of organismal origin, it is false. We may cut off the tails of mice for generation after generation and never find any individual born with a shortened tail. It is probable, however, that the organismal response to the trauma (in rapidity of healing, etc.), if capable of betterment, becomes more effective with repetition; such changes might admit of at least statistical demonstration.

Apart from these considerations, we must remember that both germ-plasm and soma may be destroyed by certain environmental condition or disposition (*διαθήκη*) which has become persistent and stable (*μόνιμος, ἔμμενος*), and which is with difficulty broken up or altered (*διόρκετος, διασπλάϊστος*).^{*} A *cachexia* is, literally, a bad habit (*καχεξία* = *κακή ἔξις*), as *euxia* is the opposite. Now the different diatheses or habits depend on the way in which the humours (*χυμοί* = humos = humor) are mixed—the mixture (*ἐμῆσις*) may be well or badly carried out (*ευεμασία, δυσεμασία*). Our modern pathology is tending to return to the standpoint of the Greeks: we call the humours "hormones," and explain different physiological and pathological states by their various combinations.

agencies (*e.g.*, toxins; "blastophthoria"). Short of this, they may both be devitalised, *i.e.*, their power of effective reaction to external stimuli relatively lessened. Thus the persistent drinking of alcohol to excess may damage not merely body-cells but also the substance of the germ-plasm, so diminishing the vitality of any subsequent progeny. The germ-plasm, however, appears to be more conservative than the soma, needing a considerable degree of such bad treatment before it can be materially affected.

As a general rule, the organism adapts itself more readily to small than to extensive changes in the environment. In the case of a succession of small changes it may, apparently, either adjust itself to each as it comes (fluctuation, continuous variation), or it may wait till there has been a summation of such stimuli, when, without passing through any apparent transition stages, it may suddenly effect a very decided and abrupt alteration in its structural or other activities (mutation, sport, or discontinuous variation).

While both organism and environment necessarily participate in all such changes, we may get now the one and now the other playing the predominant *role*. An organism not merely reacts to its environment, it acts upon it.

If we contrast an ordinary developing child with one which is "backward," we will often notice that it is in initiative that the latter is primarily and fundamentally lacking; it is not so much that he has not got a brain as that he objects to use it. Whereas the healthy child will constantly, of his own accord, seek out new problems, and attempt zealously to master them, the defective child can only be induced to do so by extremely tactful handling and plodding perseverance on the part of the parent or teacher; failing such intelligently directed environmental stimulus, he may be allowed to remain all his life practically at the stage of infancy, although in all likelihood possessed of the capabilities of very much further, if perhaps not of complete, development.

These children differ relatively from one another; in the one the organismal factor is strong, and each stage of growth naturally provokes the next (Semon's "phasogenous ecphoria"⁵), whereas in the other the development tends to cease almost entirely unless an excess of environmental stimulus be brought to bear on it: here lies the opportunity of education, in the proper sense of the term.

When the variation carried out by the organism leaves that

organism in a renewed condition of equilibrium with its surroundings, we reckon its state to be normal or physiological: when, however, it fails to adjust itself, the term *disease* may be used. This term has also been applied, though without proper justification, to cases in which, in answer to an unusually sudden or unwonted environmental stimulus, the organism has been called upon to put forth greater efforts than usual. Thus, when the body is invaded by micro-organisms to which it has not been accustomed, the result usually is a more or less powerful reaction (inflammation, etc.) on its part. We cannot properly speak of disease here, unless either the organism fails to react effectively, or the intrusive agent manages to frustrate its utmost efforts. Ordinarily an organism learns by experience. When a doctor, then, is called in to see a patient whose system is attempting to adjust itself, say, to some microbic invasion, he should only interfere when he sees that the fight is obviously going against the patient, and that he is in danger of being either killed or permanently disabled. If the microbe is one with which the patient is likely to come often again in contact, the doctor should be very slow in depriving (or attempting to deprive, for he often cannot do it) his patient's system of this opportunity of garnering experience.

This principle would apply in most cases of infection by such simple and ubiquitous germs as, for instance, those of nasal catarrh; there are, of course, however, many micro-organisms which, though probably originally harmless, have acquired their characteristic pathogenicity or virulence through prolonged sojourn in unhealthy soils (*e.g.*, the germs of diphtheria, gonorrhoea, syphilis, etc.); the effect of these in an individual who has had little or no experience (personal or racial) of them is apt to be so disastrous that practically no good can be expected to result to him from allowing his system to be exposed to them. In such cases, then, artificial and extraneous interference (by specific vaccines, serums, or other substances, where available) is usually indicated. The case of tuberculosis is still *sub judice*. Under the name of tubercle bacillus there have apparently in the past been grouped forms varying greatly in pathogenic power; in any case, the bovine bacillus is admittedly less fatal to human beings than the more specifically human type or types, and attacks more particularly the glands in children. It is maintained by some that people who have suffered from various strumous conditions in childhood (*i.e.*, "attenuated" forms of tuberculosis) are relatively immune to

attack by the human type of bacillus in later years.* In other words, just as in pre-vaccination days the country people knew that an attack of cowpox protected against smallpox, so it is claimed that a personal experience of the relatively mild cow tuberculosis will prevent the more fatal human affection. This argument does not appear to have been quite conclusively met by those who advise that all milk given to children should be completely sterilised; it will, at least, lend support to the advocates of carefully graduated doses of tuberculin as a prophylactic. Clive Riviere¹⁰ maintains that, pending the discovery of a safe method of immunisation for human beings, we have in the meantime "to choose whether our children shall be immunised by living bacilli of the human or bovine type, for that they will be infected by one or other is certain. The safest and most practical method open to us at the present time seems to me to lie in the use of a well-mixed milk, such as the large London dairy companies supply. In such a milk the bacilli must be well diluted and the danger of massive dosage reduced to a negligible figure. It must not be forgotten, however, that dosage is relative, and the resistance to tubercle is at a minimum during the first few months of life. It would seem best, therefore, to sterilise the milk at first and gradually add to it increasing quantities of raw milk, till this alone is given." Plainly, all children should be fed at the breast during the first few months of their lives; this is far the most pressing reform needed in this connection. After the first year, if they be otherwise in good health, they are probably mostly quite capable of adjusting themselves satisfactorily to the ordinary mild strains of bovine bacilli, provided, naturally, these be not taken in too massive doses. Special temporary measures, of course, may have to be taken in particular districts, as, for instance, in Edinburgh, where, according to the researches of Fraser, Mitchell, and others, the percentage of bovine bacilli in the milk supply would appear to be abnormally high. A weakly child may be badly affected even by a weak microbe, and even healthy children may be unable to resist properly a particularly virulent one. The occurrence of virulent strains of bovine bacilli will probably be best prevented by legislation ensuring that cows will be kept in more hygienic

* "I have also been particularly impressed with the fact that children who suffer from the surgical forms of tuberculosis—such as tuberculous glands, joint disease, and lupus—very rarely, indeed, are attacked, even in the later stages of their malady, by phthisis pulmonalis. . . . A mild attack of bovine tuberculosis protects against phthisis pulmonalis."—NATHAN RAW.⁹

conditions than is always the case at present. It is hardly desirable that all cows should have no "tuberculosis" at all. We must remember that there are tubercle bacilli and tubercle bacilli, some of them apparently having little or no pathogenic properties at all—at least in healthy subjects. Above all, let us aim at keeping the tissues of our children (as well as of our cows) healthy, by giving them plenty of freedom, and allowing them to live in a natural way; thus they will best develop an immunity not only to tubercle bacilli, but to all the other ordinary micro-organisms which surround them.

As to the common infectious diseases of childhood, such as measles, scarlet fever, and whooping-cough, it seems that most children who are susceptible to these are the better of going through them—provided they are in an otherwise healthy condition—and that, in the teeth of much well-meant interference on the part of constituted authority, Nature is gradually evolving a racial immunity to these among civilised peoples. (It need hardly be added that artificial protection is strictly indicated in epidemics of virulent forms of these affections—such, for example, as are sometimes apt to occur in institutions. Moreover, so long as unnaturally crowded conditions obtain in our cities, public schools, etc., a certain amount of isolation will remain unavoidable, even in respect to some of the comparatively mild infectious diseases.)

Under certain circumstances the organism or cell, while having, to all appearance, satisfactorily solved its problem of adjustment to a novel environmental factor, may, as subsequent events show, be left actually in a state of less efficiency than before; this is proved by the fact that when challenged again with the same problem it will this time acquit itself less favourably than on the first occasion. When, for example, there is introduced among the tissue-cells a protein differing considerably in specific composition from those with which these cells have ordinarily to deal, it seems sometimes as though the cells are only just able to accomplish the task of adaptation satisfactorily and are then left in an exhausted condition—at least so far as their power of dealing with this particular protein is concerned—the fact that they are thus specifically exhausted being proved by the observation that repetition of the dose, even if it be a quite minimal one, causes extreme local or even general distress. To this phenomenon—usually as produced by foreign proteins—the term *hypersensitiveness* or *anaphylaxis* is applied. Essentially the

same thing, however, is caused by various inorganic substances; thus, while to most food-substances and to many drugs a *tolerance* or *immunity* (that is, adjustment) either exists naturally, or may be acquired by habituation, there are others towards which certain people show remarkable idiosyncrasies which appear to be of the nature of anaphylaxis. This phenomenon of failure to react effectively is, as we might expect, not only to be witnessed in the behaviour of such low organisms as cells; we may see it every day in that of the most highly specialised organism that we know—namely, man himself. As already said, man in the stage of childhood is daily confronted with new problems which, even with a little stumbling at first, he successively masters. *Experientia docet*. Observe, however, the backward child, to whom reference has been made. If, when he is making his first attempt to walk, he stumbles and falls over some obstacle on the floor, so far from learning by this experience and doing better on a future occasion like the ordinary healthy infant, he probably does this same action even more clumsily the next time, and falls perhaps even without encountering any obstacle at all. We see the same thing every day in our so-called neurasthenics; many of these are essentially people who refuse to learn from their experiences—who either try to evade, or allow themselves to become demoralised by their experiences. Clearly the same principle is illustrated both in the conduct—or lack of conduct—in these nervous cases and in that of the cells which develop a hypersensitiveness to foreign proteins.

As already said, the individual, in the ordinary course of his development, exhibits behaviour in which there is a more or less well-marked phylogenetic element. (The definite formulation of this principle we owe to Haeckel.) Again, under more or less abnormal or unusual circumstances this principle may also come into operation; it is sometimes open to the organism to *reculer pour mieux sauter*. Thus in inflammation we may find the fixed connective-tissue or endothelial cells reverting, for greater effectiveness, to a more primitive and mobile (amoeboid) stage, and helping the ordinary fighting and scavenging forces of the body (leucocytes) to repel or otherwise dispose of the invading germs.*

But we may also meet with cases of retrogressive variation

* The conception of a cycle of different phases (encysted, amoeboid, and ciliated) in the life of the cell, any one of which phases may temporarily assume predominance under suitable excitant conditions, was clearly laid down by Patrick Geddes so far back as the year 1883.¹¹

which are not effective—which imply, as it were, a failure on the part of the organism rather than a fresh output of vitality. Thus in a multicellular organism which is degenerating we may find certain of the body-cells reverting to a primitive and less highly differentiated phase, and living a selfish and greedy life at the expense of their more socialised neighbours; this appears to be an important element in the process known as cancer; the principle of subordination of part to whole (of cell to organism, etc.) would here appear to be, relatively speaking, in abeyance. It may, perhaps, be more correct to say that here we have Nature falling back on her last line of defence and attempting to preserve at least some of the more highly vitalised cells in the face of an impending break-up of the organism as a whole.*

In the province of social pathology a condition comparable to cancer is to be found. It is in the essentially degenerate and unhealthy soil of our great cities that the hooligan or *apache* appears. In an environment (economic, etc.) which tends to crush entirely his more docile fellows he, at least, refuses to succumb. The opportunities of normal development of his faculties being denied him, he is practically driven into violent courses. Hooliganism is, in essence, a perversion of that inestimably valuable social asset—the spirit of youth and of adolescence.¹² It may also be that there is in it an element of reversion to a time when personal physical strength played a greater part in determining social relationships than it ordinarily does now; probably, however, hooliganism consists more in a perversion than a reversion—more in a deviation from the normal than in an actual retrogression in racial history. In any case, the analogy between cancer and hooliganism is apparent enough. Further, we can surely see that (leaving palliatives aside) the ultimate cure of these conditions does not rest either with the surgeon's knife on the one hand or the policeman's truncheon on the other, but rather with the development of a soil on which neither form of endoparasite will be encouraged to grow. Cancer and hooliganism are, each of

* Cancer cells, thus "spontaneously" started, may, if the resistance they meet with be small, attain such virulence as sometimes to become capable of living on and flourishing even when transferred to a healthy animal (if this be of the same species as their original host). Further, it seems difficult to see any essential difference between Jensen's transplantation-tumours in mice, and those remarkable growths of embryonic heart muscle and other tissues which Alexis Carrel has succeeded in cultivating *in vitro*: the latter appear to be simply extra-somatic cancers—formless, "meaningless" tumours, proliferating abundantly and greedily absorbing the nutritive material with which the experimenter keeps them provided.

them, a local manifestation of a general morbid condition (cachexia), and for their proper prophylaxis nothing less than general treatment can be effective.

The reversionary element to which I have made allusion may be seen not merely in the conduct of local cell-groups, but also in that of whole tissues and organs. Thus (making all allowances for differences due to environment, etc.) the condition known as *talipes equino-varus* may be looked on as a reversion of a whole limb to the condition in which it normally existed in the time of our simian ancestry. Certain anthropoid apes (orangs) when on the ground walk normally on the outer edges of their feet, this probably being an adaptation for grasping the branches of trees, among which these animals spend most of their existence.

We must not, however, press this principle of atavistic reversion too far. It is not suggested, for example, that *combined twins* represent a formerly normal stage in our pedigree!

In *achondroplasia* we have an instance of the developmental arrest of a whole tissue. As was first pointed out by Symington and Alexis Thomson,¹³ the fault here lies in "those parts of the skeleton which, formed in cartilage, largely depend for their growth during fetal life upon endochondral ossification, the cause of the departure being a premature arrest or absence of this process. The bones belonging to this group are the long bones of the extremities, the ribs, the posterior part of the base of the skull, and the innominate bones." Here we have a group of bones which doubtless bear a special historical relationship to one another, and which therefore tend to be all affected simultaneously, just as are the different tissues of the leg in *talipes equinovarus*.

We might expect, *a priori*, to meet with such anomalies in intracellular as well as in intercellular behaviour, and it may be that certain secretory disturbances (as in the disorders of metabolism, gout, diabetes, etc.) are partly interpretable as reversions on the part of the cells towards behaviour which was at one time normal in their racial history. As regards the abnormal substances produced in these conditions (*e.g.*, uric acid, glucose, glycuronic acid, etc.), we are still far from knowing which are the positively harmful ones and which are those "purposely" provided by Nature to counteract them; hence our desire to "dissolve" or "neutralise" every abnormal product which we manage to detect in the blood is probably, as often as not, unwarranted. We have in the past too readily taken for granted that every unusual phenomenon observed

in a sick person was, in itself, harmful; thus we have interfered with inflammatory processes, with pyrexias, and heightened blood-pressure, without realising that these were, in a majority of cases, compensatory phenomena, implying active and probably quite efficient self-defence on the part of the organism. "Think for a moment, any one of you," says Sir James Goodhart,¹⁴ "your finger is on the pulse of excessive hardness; you want to make it *permanently* soft. Have you *ever* accomplished your purpose to your satisfaction? And if you answer 'No,' as I think you must, you may cancel your disappointment by asking yourself another question: 'If I had, where would the patient have been?'" The list of ways in which, in our zeal, we have intermeddled with Nature's salutary processes is a long one; let two or three more instances suffice. By undue immobilisation in certain fractures we have prevented the slight functional movements on which proper union depends. In other cases we have checked beneficial but excessive discharges (as by the bowel, sweat-glands, etc.). Again, we have often provoked peristalsis in irritated abdomens which Nature was trying to keep at rest. Finally, as psychotherapists, we have been too ready to make a frontal attack on certain characteristic symptoms in nervous disease which are now being recognised as "defence-neuroses"—that is, as at least provisionally useful procedures by which the organism tides itself over a crisis. The warnings given by the historian Buckle¹⁵ regarding interference with disorders of societies may be recalled in this connection. "The rulers of mankind," he says, "cannot be brought to understand that, in dealing with a great country, they have to deal with an organisation so subtle, so extremely complex, and withal so obscure, as to make it highly probable that whatever they alter in it they will alter wrongly, and that while their efforts to protect and to strengthen its particular parts are extremely hazardous, it does undoubtedly possess within itself a capacity of repairing its injuries, and that to bring such a capacity into play there is merely required that time and freedom which the interference of powerful men too often prevents it from enjoying."

While one would not subscribe to Buckle's *laissez-faire* principles in their entirety, yet his criticism of measures of local interference are plainly applicable to-day, not only in the field to which they were originally applied, but also in that of medical and surgical treatment.

The famous eighteenth-century physician, Théodore Tronchin, said, concerning the self-reparative powers of the human organism¹⁶:

“On perd le respect sacré qu'on doit à la nature. En le perdant, tout est perdu. On n'imagine plus que celui qui a fait nôtre corps a donné à ce même corps l'admirable faculté de se suffire à lui-même pour conserver sa santé et pour la retablir quand elle est dérangée. Connaître cette faculté et les moyens d'écarter les obstacles qui en empêchent l'action, voilà la tâche du médecin, celle qu'Hippocrate avait commencée, celle que ses disciples auraient dû se proposer.”

While we should endeavour increasingly to subordinate local to general treatment, we shall yet constantly be placed under the necessity of applying palliatives, if only to “tide over” conditions of acute stress. Yet this is a justification for such treatment only in so far as its palliative and provisional character is clearly recognised. The serious thing about so much present-day therapy is that it proceeds on the tacit assumption that if we continue to treat symptoms long enough and elaborately enough, and by “all the resources of science,” we will ultimately render treatment of the disease itself unnecessary.

The special vulnerability shown at times by certain tissues or cells as regards bacteria which at ordinary times do not trouble them may, perhaps, be looked on (apart from the occasions when it comes from a temporarily heightened virulence of these bacteria) as a reversion to a period in the individual or racial history prior to that at which immunity to these bacteria was acquired.

It is important to recognise that a healthy organism acts primarily as a whole, and that when parts of it which are naturally subordinate come to behave, as in the cases above mentioned, in a manner independent of, and deleterious to, the whole body, this implies more or less abeyance of function on the part of the central regulating principle. In so-called psychasthenic conditions we recognise that what is essentially at fault is the individuality or “will”—that is to say, the organismal factor—a principle which, owing to its most obvious functions being manifested through the nervous system, conventional psychology would have us regard as a product of that system. The will, however, in the proper sense of the term, is the principle which directs and co-ordinates all the activities of the organism, whether conscious or subconscious: the “conscious” behaviour of an individual it directs through the medium of the cerebro-spinal nervous system: the subconscious or organic through the medium of the endocrino-sympathetic.

It has been only comparatively recently observed that the nervous system alone could not account for all the obvious co-ordinations of parts in the body; for example, a few years ago Paul Bert divided all the nerves going to the mammary glands of a she-goat, and yet observed that the glands enlarged during gestation. Failing actual nervous channels to account for the interconnection of parts, an obvious explanation was that there might be certain fluids which maintained the relationship; hence arose our modern humoral pathology, the theory of *hormones*. It seems undoubted that the correlation of various organic activities is, at least partly, effected through the secretion of certain of the ductless glands, though how far the postulation of similar humours is likely to afford an adequate explanation of the whole of one's subconscious or, *a fortiori*, of one's conscious life, seems much more problematical.

Not a few conditions that a few years ago were ascribed to the presence of "toxins" are now being attributed to the absence (or perverted activity) of "hormones." Even if, however, we were ever able to isolate all these hypothetical secretions (as, *e.g.*, we have done in the case of adrenalin), we would be no nearer knowing the secret of their effective and physiological combinations (*κρᾱσεῖς*, "crases"). The idea of the characteristic unified co-ordination of parts in the organism being carried out by means of a neuro-humoral apparatus is very valuable; it is, however, merely a description of mechanisms, and does not, in the real sense of the term, *explain* the organism's unified behaviour. To suppose that it is actually an explanation is to make the mistake of the Chimiatrie school (Iatro-chemists) of two centuries ago; the insufficiency of their theory as to vital phenomena being due to ferments and solutions of salts was demonstrated by Stahl (1660-1734), best known in the history of science as inventor of the phlogiston theory of combustion. Our modern chimiatrie or humoral theory has even been used in order to account for the various steps of embryonic development, the determinant of each step being envisaged as a hormone. Here, however, appears to be a growing tendency to confuse realities with mere words; the basal fact to recognise is that co-ordination exists; the exact mechanism through which it takes place in the different phases of bodily life is still far from being understood.

It will be realised that, in one and a very essential sense of the term, "organism" implies something much more fundamental than a mere mechanically viewed "body." It is something which tends to persist and to make headway through a continuous

series of bodies, its own immortality not commoting the immortality of the bodies which it inhabits. The organism, in its truest and deepest sense, is represented by the germ-plasm, which, under ordinary circumstances, does not die.

The fact is, that the ordinary individual organism, when functioning physiologically, is essentially thereby promoting the persistence and advancement of the race, and only in a quite subsidiary sense its own persistence and advancement. This is the weighty truth underlying Sigmund Freud's view of the importance of the "sexual" element in functional nervous disease. These disorders, looked at broadly, are all traceable to a failure of the patient to fall into that part of Nature's "racial" scheme to which he or she is best adapted. The "sexual" element (especially in the narrowly erotic sense in which many of the Freudians use this term) is merely one aspect of this principle. The whole function of motherhood is one which, normally, takes up a great part of a woman's life; accordingly, when balked of an opportunity of materialising these characteristic aptitudes of hers, she has considerable difficulty—much more than the man—in finding equivalents for them. Here, at least, education, in its broadest sense, offers her a field of endeavour; the "rearing" no less than the "bearing" of the new generation is woman's proper work. Failing to discover an effective substitute for reproduction, she is yet forced to find vent for her energies in some way; not uncommonly, then, these take the form of the useless (though often temporarily palliative) activities grouped together as nervous or hysterical. The organism, as Sir Thomas Clouston insists, must "energisise," and if it fail to do so physiologically and characteristically, it will do so on a lower plane. It is important, further, to recognise that these anomalies may affect not only the characteristic ("consciously" performed) movements of the organism as a whole, but the more partial and subconscious processes as well; thus we may get anomalies of the movements carried out by non-striated muscle-fibres (*e.g.*, abnormal spasms or dilatations, cardiac, vasomotor, respiratory, peristaltic), either by themselves, or combined with disorders of secretion (as in asthma, colica mucosa, etc.). What particular manifestation of the faulty diathesis shall come most to the front in such cases depends on the proximal or immediate cause, itself largely a matter of chance; the important thing is that we should recognise the underlying condition which is common to all such affections, and which, so long as it remains unrectified, is bound sooner or later

to find expression in one form or another. Further, the "bad habits" which are so characteristic of the various psychoneuroses may find their counterparts in perversions of the structural activities of the cells—that is, in *bad habits of body* (*καχεξία*, cachexias). Thus, for example, we find a tendency to the laying on of fat (lipomatosis, adiposis dolorosa, etc.)—*i.e.*, to the formation of a tissue less highly organised than the normal—frequently associated with absence of the reproductive function (*e.g.*, following the menopause, castration, etc.). The meaning of this is that function must go on somehow, and, in default of the "discontinuous growth" (reproduction) which normally succeeds ordinary "continuous" growth when maturity is reached, the individual, unless he has found some other active outlet for his energies, tends often, as the saying is, to "run to fat." Any one of the separate organs, also, which fails to express its normal capabilities is apt to begin to energeise on a subnormal plane; witness fibro-myomas in the non-functioning uterus.* In all these conditions the greater or lesser importance of the hereditary factor must, of course, never be left out of account. The germ-plasm may bring over with it certain bad habits which it has acquired in previous incarnations, and for whose dispersal more than one life of physiological rectitude may be required.

A bodily habit, whether bad or good, is a group of cellular activities which have evolved together and grown into a complex which, in Galen's phrase, is *δύσμετος*, "difficult to break up." Clearly, the so-called Mendelian characters, on which modern science lays stress, are such groups of habits, and the difference between them and other characters is, after all, merely one of degree. On this view, the main reason why we find these characters conforming to the so-called "laws" of Mendelian inheritance—*i.e.* tending to "segregate," refusing to blend—is that they have been exposed to certain relatively stable conditions throughout lengthy historical periods: thus the mutual connection of their constituent units has been fixed by a kind of hereditary inertia; it is not to be supposed, however, that these complexes will endure as

* We may perhaps reconcile the view of the orthodox gynaecologist who says that fibroids cause sterility, with that of the unorthodox one who says that sterility causes fibroids, by suggesting that a uterus which does not get sufficient opportunity of physiological enlargement may fall into a habit of subnormal fibroid growth, and that, having once developed this bad habit, it may now prove highly disinclined to forego it in favour of the more physiological activity should the normal stimulus to gestation subsequently occur.

such long after any practical justification for their existence has disappeared.

In conclusion, I wish to offer a word of apology for the somewhat disjointed nature of the present paper; it has, as a matter of fact, grown slowly and by accretion, and bears on its face, as I am aware, certain marks of this origin. My main aim having been to show the intimate connection between the normal and abnormal manifestations of life, I have merely picked out a few of the outstanding principles of biology and thereafter endeavoured to demonstrate some of their pathological bearings. If I have in any way made clearer to what an extent health and disease are relative matters, I shall have effected my object.

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THE INTRATRACHEAL INSUFFLATION OF ETHER.

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INTRATRACHEAL INSUFFLATION consists in driving a current of air under pressure through a tube introduced by way of the mouth and larynx deeply into the trachea. The current of air, which is continuous, returns between the tube and the wall of the trachea, and escapes through the mouth and nose.

The work of Meltzer and Auer has demonstrated that this insufflation of air into the trachea under adequate pressure ventilates the pulmonary alveoli and enables the normal

diffusion of gases to be carried out for many hours, independently of all respiratory movements. If the air in its passage under pressure is made to pass through a chamber containing ether, we are enabled to introduce into the pulmonary alveoli ether vapour of varying strength.

The points to which attention may be directed are :

1. In ordinary respiration air has to be brought from outside through the nose, pharynx, larynx, trachea, and bronchi—from this point respiration consists in an interchange of gases between the tidal and alveolar air by a process of diffusion.

In intratracheal insufflation air is brought down to the bifurcation of the trachea with a certain force which favours diffusion of gases, the long intervening air-shaft which has been termed the "dead space" being thus cut out. The practical importance of this is that there can be no interference with the free passage of air between the entrance to the mouth or nose and the trachea, an interference which is so frequently responsible for respiratory difficulties during anaesthesia.

In addition, an excellent means for performing artificial respiration is always available. As an instance of its utility in this respect reference may be made to a case recorded by Elsberg in which, in a patient who had taken morphia with suicidal intent, artificial respiration was kept up for 12 hours, without any respiratory movements taking place, recovery ultimately ensuing. In our own experience the apparatus has been used with success for this purpose in three cases. In one case a man who was brought to Leith Hospital after immersion in the docks showed signs of marked respiratory failure. The respiration rate fell to 3 per minute and the patient became cyanosed. The house surgeon, after an unsuccessful attempt to help matters by artificial respiration carried out in the ordinary way, passed the intratracheal catheter and kept up insufflation of air for three hours, after which respiratory movements were re-established and the patient recovered.

In another case an operation was about to be undertaken for the relief of cerebral symptoms due to trauma. Before the skull was opened respiration ceased. Ordinary artificial respiration was of no avail, but on the establishment of intratracheal insufflation the colour gradually improved, respiratory movements were later re-established and the operation proceeded with, ether being given intratracheally.

In a third case one of us had the opportunity of testing the

method in a case of failing respiration due to opium poisoning, with very striking results.

2. In intratracheal insufflation there is during the entire period a continuous current of air blowing forcefully from the trachea through the larynx, pharynx, nose, and mouth. It has been demonstrated in the laboratory and in actual practice that during insufflation it is impossible for blood, mucus, or vomited matter to enter the larynx—obviously a point of great practical importance in many operations.

3. By the constant maintenance of sufficient positive pressure, collapse of the lungs may be prevented or regulated at will when the thorax is opened. In virtue of this, and because the method does not depend on the efficiency of the patient's respiratory movements, intratracheal insufflation of ether appears likely to displace the elaborate negative and positive pressure cabinets and masks which have been devised for intrathoracic operations.

The claims made on behalf of the method are based on the records of a large number of laboratory experiments carried out by Meltzer, Auer, and others, and on the observations of anaesthetists and surgeons in actual practice.

Our experience is derived from the use of the method in about 100 cases. The cases were not specially selected, our object being to gain experience as quickly as possible and to acquire dexterity in the technique, so that special cases might have a fair trial. The series, however, included many cases which afforded opportunity to put the method to the test with regard to the special advantages claimed for it. Among the cases coming under this category the following may be specially mentioned:—Laparotomies of various kinds, including those for gall-stones, intra-peritoneal rupture of bladder, short-circuiting intestine; œsophagotomy, œsophagoscopy, operations for mastoid disease, tubercular glands in neck, naso-pharyngeal polypus, strangulated hernia, prostatectomy, nephrectomy, laminectomy, excision of upper jaw, excision of tongue, plastic operation—cheek, plastic operation—mouth, hysterectomy in Trendelenburg position.

To commence with, we used an apparatus made after the model described by Meltzer.¹ It is inexpensive and efficient.

For the greater number of our operations we have used the apparatus devised by Mr. Kelly of Liverpool, who kindly gave one of us an opportunity of witnessing the method in operation at the Liverpool Royal Infirmary, and explained the technique.

This apparatus consists of two parts, the first part being for the production of the air current, the second for the etherisation of the air. The electric motor actuates a rotatory blower which produces a current of air. The blower runs at the rate of from 50 to 1000 revolutions per minute. The ether apparatus consists of an ether chamber, 12 cm. in diameter, covered by a metal lid, with entry and exit for the air current, and a third opening for the introduction of ether. The entry tube dips down into the air space above the ether for about 4 cm. Entry and exit tubes are interrupted by taps, geared by cog-wheels to a third tap connecting both entry and exit. This permits of variation in the ether strength of the air current from zero to full saturation. In addition there are (1) warming chamber, (2) safety-valve, (3) mercury manometer, (4) three taps,—(a) pressure regulator, (b) alternative tap for oxygen or NO_2 gas, (c) tap for reducing pressure in trachea to zero.

Opinions differ as to the advisability of warming the ether vapour. Dr. Shipway² attaches much importance to this being done, while Dr. Boothby,³ after contrasting the amount of the loss of heat directly attributable to the administration of the anæsthetic mixture with that due to elimination by the skin in the same period, comes to the conclusion that "our attention should be directed to keeping the patient dry and warmly covered and not to the procedure of warming the anæsthetic mixture. Such warming of the inspired air is futile from the point of view of thereby sufficiently preventing a lowering of the body temperature during a surgical operation." In the same paper Dr. Boothby demonstrates the effect on the ether percentages of keeping the liquid ether warm, and the later pattern of Mr. Kelly's apparatus provides for this being done.

The preliminary administration of morphia (gr. $\frac{1}{10}$ th) and atropine (gr. $\frac{1}{100}$ th) has been the rule. In alcoholic subjects it would probably be an advantage to add scopolamine (gr. $\frac{1}{100}$ th).

Induction is carried out in the ordinary way.

For the introduction of the catheter we have used Hill's endoscope. The passage of the catheter is at first a matter of some little difficulty, but with practice it becomes comparatively easy. The important points to attend to⁴ are: (1) thorough relaxation before attempting intubation—the lower jaw should be so slack that a gag is not required; (2) the head should be placed in the occipito-shoulder position; (3) the epiglottis must be identified, and the speculum passed sufficiently far below its tip that it will

not slip; too deep insertion must be avoided. The speculum should be held in the left hand and the hyoid bone lifted by a tilting movement of the hand. The glottis then comes into view, and there should be no difficulty in inserting the catheter, which should be made rigid by means of a probe. We have used silk web white enamelled cylindrical catheters. They stand boiling fairly well if care be taken not to leave them too long in the boiling water and if each catheter is wrapped in a piece of gauze so that it is not in contact with another catheter. The instrument is pushed nearly to the bifurcation of the trachea—a point in the adult about 26 cm. from the incisor teeth—the probe is withdrawn and connection made with the air current. The size of the catheter varies with the build of the patient. In all but exceptional cases our experience leads us to believe that the maximum size should be 24 F., ranging downwards from this. Too large a catheter will interfere with the return current of air.

Occasionally the tube has been passed into the œsophagus; this occurred several times in our earlier cases. With care and adequate relaxation such a mistake should not occur, but the possibility of it should be kept in mind. If the patient has been properly anæsthetised and the tube introduced without delay any glottic spasm which supervenes should rapidly pass off. The degree of concentration of the vapour should not be too high to commence with or irritation will result, evidenced by spasm and coughing. The pressure should vary according to the requirements of the case. Other things being equal, the lower the pressure the higher will be the ether percentage obtained. The limits, as a rule, are from about 10 up to 30 mm. Hg. The safety-valve should be so arranged as to make any pressure above this impossible.

In the majority of cases the course of anæsthesia has been perfectly smooth and uneventful—the colour remained a rosy pink, the pulse good, and the respirations quiet and regular. There was a noticeable absence of strain of all kind, the condition resembling natural sleep rather than narcosis. As a rule, the anæsthesia is light and easily controlled by turning the regulator either towards “full ether” or “air,” and at any moment the ether can be turned off altogether, the apparatus being at once converted into one for performing artificial respiration.

It is undesirable that the respiratory movements should be abolished altogether; their presence indicates that neither the central nor the peripheral respiratory mechanism is being over-

dosed with ether. At the conclusion of the operation, before withdrawing the catheter, it is well to flush out the lungs with air so as to remove any ether vapour that is present. This is accomplished by turning the regulator to "air" for a few minutes. In a few cases, notably in big alcoholic subjects, difficulty has been experienced in securing a sufficiently deep anaesthesia with good relaxation. In two of our cases the attempt had to be abandoned, and anaesthesia maintained by other methods. The attempt in such cases to give a more concentrated vapour has in our experience led to coughing and spasm. Probably, as previously suggested, the addition of scopolamine to the preliminary dose of morphia and atropine would be advisable, and it is particularly important to produce a deep anaesthesia in such subjects before commencing insufflation.

There has not been any case of sickness during the insufflation. With such a limited experience to draw upon, it is difficult to speak with any assurance regarding the question of shock. The absence of strain and the perfect aeration should certainly help to lessen shock, and the general opinion appears strongly to favour the view that it does so. In our series there was one case of bronchitis occurring after an operation for goitre. In a few cases there was some hoarseness and complaint of sore throat, more marked in the early cases, and possibly due more to clumsy introduction than to irritation from the intratracheal tube. There has been no case of pneumonia.

After-sickness occurred in a certain proportion of the cases; it is generally held by those who have had experience of the method that the amount of after-sickness is less than after ordinary inhalation anaesthesia. In the meantime we refrain from expressing an opinion on this point.

In estimating the value of this method it is in the first place to be remembered that it is essentially a method of maintaining anaesthesia; it does not touch the problem of satisfactory induction. The general conclusions to which we came may be briefly summarised. Provided a satisfactory apparatus is used and reasonable precautions are taken, the method is a very safe one. The precautions referred to are concerned with such points as the skilful introduction of a properly-sized tube, the regulation of the pressure, and the maintenance of respiratory movement.

In prolonged operations the method provides a quiet even anaesthesia, with perfect aeration and marked absence of all strain. One is struck by the peaceful nature of the anaesthesia, the con-

dition, as previously remarked, resembling a natural sleep rather than a narcosis. In abdominal operations the quiet respiration and the relaxation of the muscles of the abdominal walls make the method a very satisfactory one, especially in operations in the upper part of the abdomen. It promises to relieve the respiratory embarrassment which is sometimes seen during the course of anæsthesia in stout patients who are placed in the Trendelenburg position.

In all operations about the mouth, such as those for excision of the upper jaw, antrum operations, or those undertaken for removal of naso-pharyngeal growths, any danger of aspiration of blood, mucus, etc., is removed, and the anæsthetist is well out of the surgeon's way. There is no interruption to the regular delivery of ether vapour, which is so liable to occur in such cases with ordinary methods. In operations for removal of glands in the neck or for mastoid disease the surgeon has the field to himself, and is not hampered, nor is his asepsis endangered, by the proximity of the anæsthetist's mask. In such operations as laminectomy and nephrectomy the postural difficulties with which the anæsthetist has to contend, and which also tend to interfere with free respiration, are eliminated. We have unfortunately not had the opportunity of testing the method in thoracic surgery. The opinion has been expressed that it will supersede the positive and negative pressure cabinets and greatly extend the possibilities of intrathoracic operations.

In conclusion, while anxious to avoid making extravagant claims, we suggest that in intratracheal insufflation of ether we have a very safe method of maintaining anæsthesia, which in properly-selected cases offers great advantages, and which deserves to take its place alongside of other methods at the disposal of the anæsthetist.

In addition, as a means of maintaining artificial respiration, the intratracheal insufflation of air carried out in this way appears to us to be invaluable.

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 September 1913, pp. 830, 832. ⁴ *Surg. Gyn. and Obst.*, vol. xvii. No. iv., October
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ON THE RONTGEN RAY AND BISMUTH MEAL METHOD
AS AN AID IN DIAGNOSIS OF SOME ALIMENT-
ARY DISEASES.*

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IN the present communication I shall omit all reference to diseases of the stomach, leaving this for a future occasion, and confine myself to the consideration of some of the conditions in the large intestine in which radiography proves useful. I should be wanting in a sense of proportion if I did not at the outset remind you that the X-ray and opaque meal is only one of many means that you are familiar with for arriving at a correct diagnosis in alimentary diseases. Indeed I think its most brilliant achievement lies rather in the direction of confirming conclusions already arrived at by other and better-known methods than in that of making independent discoveries, and the nearer we approach to perfection with our skiagrams, the greater is the necessity for a thorough clinical examination. But whilst this is my belief, I must also remind you that there are few cases in which radiography cannot give some help, and that in cases of intestinal stasis and allied condition its aid is indispensable. We cannot forget that but for the work of Alfred C. Jordan, Arbuthnot Lane could not have opened up the new field of surgery with which his name is associated, and that nearly everything worth knowing about the normal intestine has been taught us by another great radiographer, Hertz. A remark was once passed that more mistakes had been made in diagnosis by the X-ray method than by any other, and I must admit there is a considerable amount of truth underlying it, the reason being that we were unfamiliar with the normal radiographic appearances of the alimentary tract; the writing was all Greek to us because we did not know the alphabet. In the second place, we were apt to ignore, to pass over as of no account, clinical facts discovered by other means, and to depend entirely on the radiograms which were—and I am speaking of my own work only—poor at the best; and lastly, we did not recognise the importance of examining the whole alimentary tract. When we remember how closely interdependent the organs of this system are, we can realise how much useful information we must have missed when we confined our observations to the stomach alone or to the large intestine alone.

* Read before the Medico-Chirurgical Society of Edinburgh, 4th February 1914.

As regards technique, I always endeavour to be allowed to make a complete examination, and remembering the remark frequently made by, amongst others, Professor Russell, that the bismuth meal is one thing and the ordinary meal another, I endeavour to make the meal as palatable as possible, and have found that bread and milk have proved most acceptable to the patients. Ninety per cent. of them say it is very good indeed, 5 per cent. say it is better than they expected it to be, and the remaining 5 per cent. —well, I do not believe they would be pleased though I were to bring down manna from heaven. The entire meal consists of $2\frac{1}{2}$ ozs. of bismuth oxychloride or Merck's barium sulphate, $2\frac{1}{2}$ ozs. of bread crumbs, about 6 ozs. of hot milk, and a little sugar; the whole is carefully mixed and served as daintily as possible. During the time the patient is taking the meal I carry on a conversation, which I make as diverting as my mother-wit will allow of my doing. After the meal is finished the patient undresses, the time thus occupied allowing the meal to settle in the stomach and separate itself from the gases always present. I then place an opaque disc on the umbilicus and make my first screen examination, centring the tube over the anatomical position of the pylorus. After having made a careful screen examination I expose a plate—all my examinations are made with the patient in an upright position. In order that there may be no risk of the bowels moving during the period they are under examination I advise that they be thoroughly emptied the day before the examination is made, and in order that I may interfere as little as possible with the patient's daily routine I insist upon their coming to me about 9 o'clock in the morning, without having had any breakfast. This I supply in the form of the opaque meal. The next examination is made at 1 o'clock, the patient receiving strict injunctions to take no food, solid or liquid, in the interval. After the second examination the patient is allowed to take lunch, afternoon tea, dinner, as usual. No purgative is administered during the time the examination is being undergone. Taking Hertz' time-table as my guide, I find that making examinations at intervals of $3\frac{1}{2}$, 8, 12, and 24 hours after the first one gives all the information obtainable in most cases, though one has occasionally to go on for 36 and 48 hours or even longer; very often the 12-hour examination can be omitted, this depending on the rate of progress observed on the screen. In the short series of illustrations which I give I have endeavoured to demonstrate some of the directions in which skiagraphy may be of use, and have tried

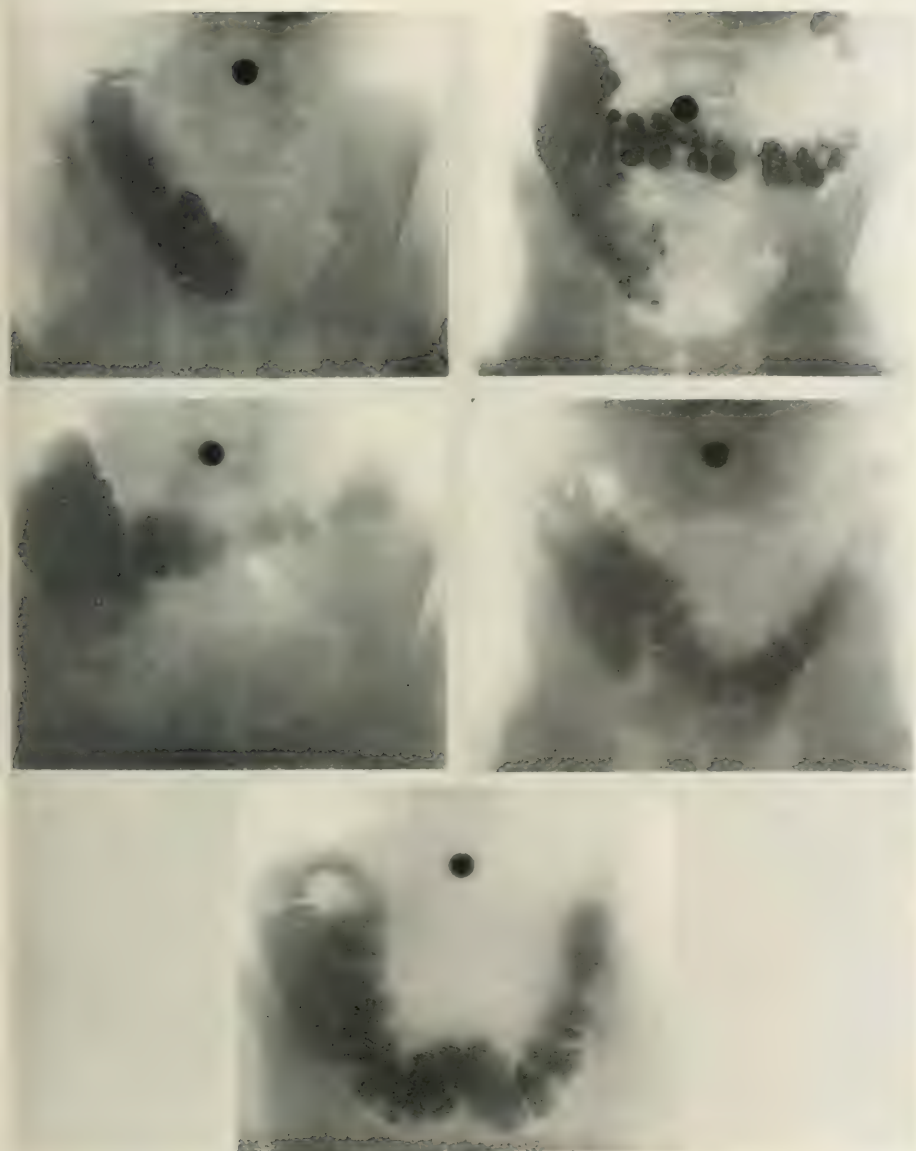


FIG.

FIG.

FIG. 5.



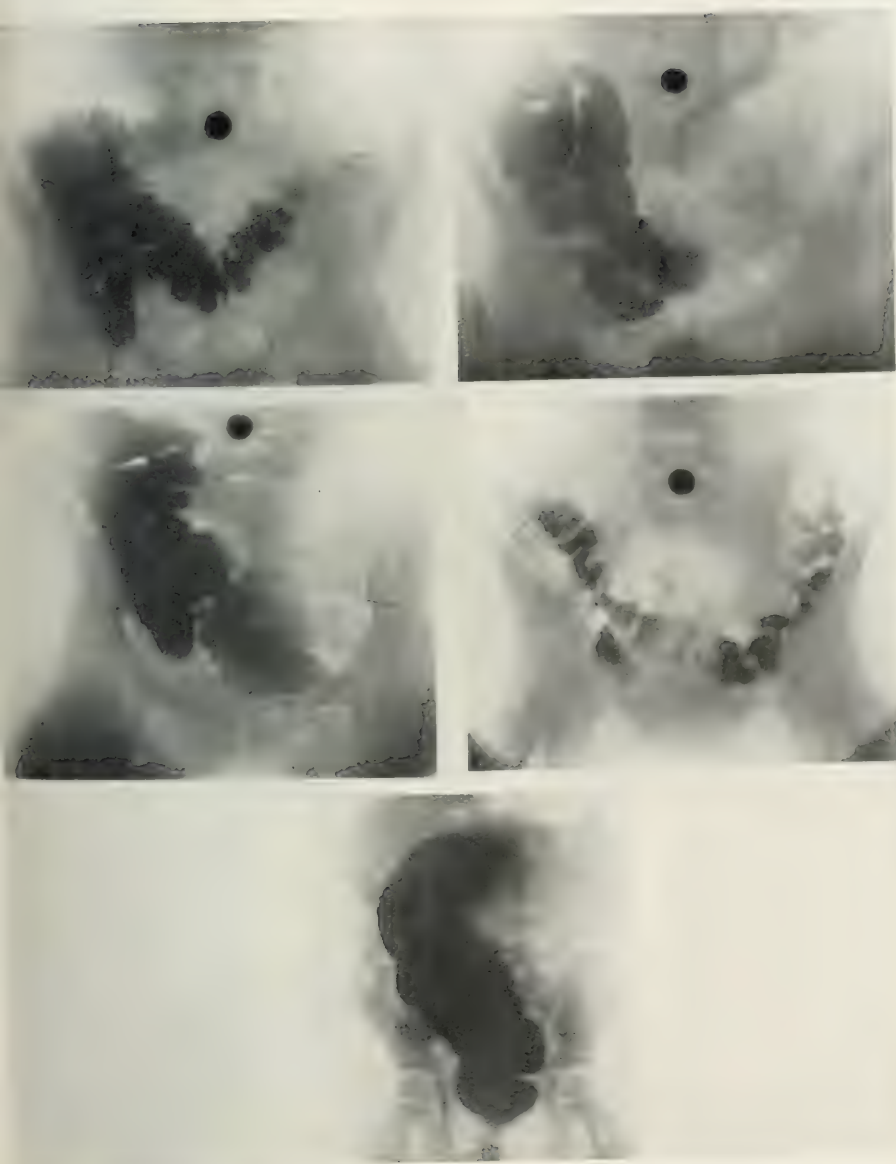


FIG. 2c.

to arrange them in a series which increases in severity, both as regards the symptoms and the operative interference demanded, beginning with a case in which medicinal and other non-surgical treatment is sufficient to effect marked improvement, and ending with cases in which a large portion of the large intestine had to be resected. These skiagrams will, I believe, convince you that by means of radiography we are able to determine the following important points:—(1) The *position* of the various organs comprising the alimentary tract both in health and disease. (2) The *shape* of these organs under the two conditions, though you must always bear in mind that it is the flat shadow of a more or less cylindrical organ that you are observing and not the organ itself. (3) The *rate of progress* through the alimentary canal of the contents, so that should delay be one of the conditions, your attention will be directed to the affected area with unerring certainty. (4) The *condition* of the muscular walls of the alimentary canal, whether they are healthy or in a state of degeneration, so that when operative interference is decided upon, the surgeon has some information regarding the extent of the disease, and can put before the patient and his friends the nature of the operation he will probably be called upon to perform, a not unimportant point in many cases.

Fig. 1, taken ten hours after a meal, from a boy 16 years of age, sent by Dr. Burn Murdoch, who suffered from marked constipation and periodic attacks of drowsiness, which lasted for ten days at a time. The cæcum is low and ballooned, and the bismuth has barely reached the hepatic flexure.

Fig. 2, from the same case taken 24 hours after the meal, shows the cæcum just beginning to empty, a great accumulation at the hepatic flexure, no ptosis of the transverse colon, and a little bismuth just reaching the splenic flexure. It took 48 hours for the bismuth to reach the pelvic colon and rectum. With medicinal and other non-surgical treatment the patient has remained very well during the past two years.

Fig. 3, taken 24 hours after a meal, showing the bismuth accumulating in the cæcum, hepatic flexure, and right half of the transverse colon, only a trace reaching the splenic flexure, is from a young lady, sent to me by Dr. John Playfair, who suffered from all the symptoms attributable to chronic constipation, and the skiagram affords evidence of marked delay in the cæcum and hepatic flexure. At the operation the cæcum was found to be thin-walled and prolapsed, the appendix was retrocaecal, large and

inflamed, while there were adhesions between the hepatic flexure and the gall-bladder, and between the ascending colon and the first half of the transverse colon.

Fig. 4, taken 8 hours after the meal, from a young man 25 years of age who suffered from constipation for 12 years and had had an attack of enteric fever seven years before, being sent to me by Dr. T. J. Thomson, complained of drowsiness and unfitness for work, but had never had any pain. In 8 hours the bismuth was filling practically the whole of the large intestine, the transverse colon was prolapsed, and the appendix was patent and curved upon itself. But whilst the patient complained of constipation, the bismuth meal indicates an acceleration of the progress of the contents through the large intestine. At the operation the appendix was found to be full of concretions, and its removal has been followed by marked benefit.

Fig. 5, taken 24 hours after the meal, from a patient, sent me by Dr. John Darling, who suffered from chronic constipation, headache and depression, and faintness for 15 years, shows marked prolapse of the transverse colon, with an accumulation of bismuth in the cæcum. I may remark here, however, that a mere dropping of the transverse colon is not necessarily a pathological condition, many people with very low colons being perfectly normal and healthy in every way. This patient has had no surgical treatment, but has improved considerably with treatment by static electricity.

Fig. 6, taken 24 hours after the meal, from a young man with marked symptoms of neurasthenia, who complained of constipation, indigestion, and unfitness for work, and who, having had a gastro-enterostomy done with no beneficial results, was sent into Chalmers Hospital. The skiagram showed a prolapse of the cæcum and a dilated ascending colon and first half of the transverse colon, and marked delay in this region of the large intestine. At the operation Mr. Stiles found that the walls of the cæcum, ascending colon, and first half of the transverse colon were thin and papery, whilst the second half of the transverse colon was healthy. He accordingly resected the former portion of the large intestine and anastomosed the ileum and the second half of the transverse colon.

Fig. 7, taken 36 hours after the meal, shows a prolapsed cæcum and an enormously dilated ascending colon and first half of the transverse colon, together with spasm (?) of the second half of the transverse colon. In this patient a cæcostomy had been done in

order that the large intestine might be thoroughly washed out. The plan succeeded for a time very well, but eventually the patient discovered that the water flowed freely for a time and then regurgitated through the cecostomy opening, none passing on to the rectum, and the reason can be seen in the two large sacs formed by the cecum and ascending colon on the one side and the dilated and dropped first half of the transverse colon on the other, with the second half of the transverse colon apparently in a state of spasm. It was only after the administration of morphia that natural movement of the bowels could be obtained. Mr. Stiles performed an ileo-pelvicocolostomy with the intention of doing, if necessary, a colectomy at some future date.

Fig. 8, taken 32 hours after the meal, from a patient, sent me by Dr. Frost, shows an almost exactly similar state of affairs to that seen in *Fig. 7*, an interesting point being that the two patients are near relations.

Fig. 9, taken 32 hours after the meal, from a patient, sent me by Dr. R. M. Ronaldson, shows a large intestine in an advanced state of atony.

Fig. 10, taken 48 hours after the meal, is from a case of Hirschsprung's disease occurring in a boy five years of age. Note the enormous dilation of the pelvic and descending colon and the fact that the descending colon has swung over to the right of the middle line. The patient was sent into Chalmers Hospital, and Mr. Stiles did a colectomy, with a very satisfactory result.

REPORTS OF SOCIETIES.

Edinburgh Obstetrical Society.

A MEETING was held on 10th June 1914, Sir Halliday Croom, President, in the chair.

Dr. A. C. McMaster showed specimens of *hydatid mole*, in which the size of the uterus was the same as, or was smaller than, a normal pregnancy of the same age. He maintained that errors in diagnosis were apt to arise because of the usual belief that a hydatid mole was always associated with excessive expansion of the uterus. This might be so, but it was usually not the case.

Dr. Foadyee read a paper on "*A Case of Pregnancy in a Malformed Uterus.*" The patient was seen when three months pregnant with a swelling in the right iliac region. Bimanually it was felt to press low down into the vaginal fornix, the uterus being displaced to the right side. The diagnosis rested between tubal pregnancy, pregnancy plus a cyst in the broad ligament, and pregnancy in a malformed uterus. She was left for some time—until 4½ months—when she was operated on. The uterus was removed by supra-vaginal hysterectomy, some difficulty being met with on the right side owing to the opening up of the broad ligament. On cutting through the cervix it was found to have a double

canal. The vagina and vaginal portion of the cervix were simple, therefore the condition was uterus subseptus.

Dr. Ballantyne thought the best treatment had been carried out.

Dr. Berry Hart read a paper "*On Atypical Male and Female Sex-Ensemble (Hermaphroditism and Pseudo-hermaphroditism)*." In some preliminary remarks the speaker stated that he held the sex gland to be the only criterion of sex. Thus in typical and atypical cases the sex was either male or female. What one studied really was the "sex-ensemble"—the "altogether" of effective sex. In the normal female the sex-ensemble was made up of (1) ovary, tubes, uterus, vagina, and external genitals—the potent portion; (2) the opposite sex-duct elements, epoöphoron and paroöphoron—the non-potent portion; (3) the secondary sexual characteristics as to hair distribution, mammae, pelvis, bones, larynx, and psycho-sexual powers. The normal male ensemble had (1) descended testes, vas deferens, and phallus—potent organs; (2) opposite sex-duct elements, hydatid testis (Müllerian), and prostatic utricle (hymeneal)—non-potent; (3) secondary sexual traits—hair distribution, mammae, pelvis, bones, larynx, and psycho-sexual powers. In both of these the potent organs were at a maximum and the non-potent at a minimum with the secondary sex traits congruent. This was an ultimate probability result, and any increase in the minimum gave a diminished maximum and a non-congruence of the secondary characters. The essence of atypical male and female sex-ensemble was thus a ratio disturbance in the duct elements of the sex-ensemble and secondary traits. The classification proposed was—I. *Atypical Female Sex-Ensemble*. II. *Atypical Male Sex-Ensemble*. There could be no glandular hermaphroditism as no ovo-testes had as yet been demonstrated. It was theoretically possible. Transverse and lateral hermaphroditism were non-existent if one took the sex gland and not the duct element as the criterion of sex.

I. *Atypical Female Sex-Ensemble*.—Fibiger of Copenhagen had written comprehensively on this division, and Dr. Hart showed, through the kindness of Mr. John Fraser and Dr. Carnegie Dickson, a case in a six weeks child. Such cases were, externally, like hypospadiac males, and a prostate, uterus, tubes, ovary, and vagina were present, the last opening with the prostatic sinus by a slit like the vasa deferentia in the male. The secondary characters varied; the thyroid cartilage might have male or female ossification. Fibiger's second case had a wife and three children (by another father, according to the widow's statement), and he had female psycho-sexual feeling—was an invert indeed. In all these cases it was significant that the suprarenals were large, and this was well shown in Fraser and Dickson's case.

II. *Atypical Male Sex-Ensemble*.—This is to the atypical female division as 10:1. Typical cases were described from those by Leopold, Neugebauer, Luksch, and Tuffier and Lapomte. In such the testes may be in the split scrotum. Tuffier's case was remarkable as the patient was somatically an attractive woman. The testes were in the split scrotum, and this was absolutely proved by an incision, inspection of the sex gland, and microscopical examination of a piece of it. Psycho-sexually the case was an "invert" and proposed marriage with a man. Somatically the limbs, hands, and feet were male, the pelvis female. There is thus in atypical male and female sex-ensemble a disturbed ratio between the potent and non-potent elements of the sex-ensemble, duct-tract, and a non-congruent distribution of the secondary sex traits.

In conclusion, the mechanism of this, and questions of diagnosis and prognosis and of treatment were considered. An epidiascopic demonstration of

specimens was given and Mr. Fraser's and Dr. Carnegie Dickson's specimen was shown.

Dr. Ballantyne thought that Dr. Hart had advanced the subject very greatly by his classification. Dr. Haig Ferguson believed that the paper would take its place worthily beside that of Sir James Simpson's on the same subject. Dr. James Young referred to a case which he had seen of the atypical male sex-ensemble. It was an individual with a vagina, a split scrotum, the labia containing testicles. The general form and development was that of a man. This person was brought up as a girl and was married to a man. When the true state of affairs was realised her hair was cut short, the female clothes were exchanged for male attire, the marriage was annulled, and later he married a woman.

RECENT ADVANCES IN MEDICAL SCIENCE

MEDICINE.

UNDER THE CHARGE OF

W. T. RITCHIE, M.D., EDWIN MATTHEW, M.D., AND
J. D. COMRIE, M.D.

SYSTEMIC BLASTOMYCOSIS.

IN the *Archives of Internal Medicine* for April 1914 twelve papers appear dealing with the important subject of systemic blastomycosis. In the first paper Stober of Chicago discusses its pathological, bacteriological, and clinical features. The other papers, by various authors, describe illustrative cases.

Stober points out that the condition is undoubtedly much on the increase—200 per cent.—over the last two years, in part probably because more cases have occurred, but chiefly because the condition is now better recognised. Its recognition is important both on its own account and because it is frequently mistaken for tuberculosis. The disease occurs in early life, most of the cases recorded having been under 34 years of age. It is found chiefly in men, and in men accustomed to hard manual labour. It is probably not contagious, and may be preceded by an injury which gives the opportunity for direct inoculation.

The disease is caused by a mould, which, because of its budding form, is called blastomyces. The causal relationship has been established because the blastomyces is found in the tissues affected, it can be obtained in pure culture, and by experiments on animals lesions similar to those in man can be produced. For some considerable time it has been known that this mould affected the skin, producing characteristic lesions. It is now accepted to be the same as that found affecting internal organs.

The Organism.—The blastomyces appear as round or oval bodies, often budding in pairs or in clumps, varying in size, an average being

20 μ . The central portion is clear, and when stained takes on a granular appearance, the granules taking a basic stain. The capsule is homogeneous with a double contour. Stoebér's paper has numerous illustrations of the mould and its growth when cultivated. It grows very readily on sterile moist bread, paper, sawdust, fruit, etc. In cultures the typical mycelium is obtained. The paper contains a full account of the various forms and appearances of the mould and its cultures.

The investigations of Stoebér and his collaborators included a careful survey of the homes and surroundings of the patients affected. They found that the first symptoms developed in the months when great dampness is present, and when, therefore, moulds grow best. The patients all lived in basements with damp floors and walls on which moulds grew. They found many points of similarity between these moulds and the blastomyces separated from patients. They infer that the infection from such places finds its way into man through respiration, and actually it was found in their series of cases that the respiratory system is first of all affected and from it the condition spreads to other organs.

Organs and Tissues Affected.—Many examples of infection of the skin by blastomyces have been recorded, and such cases usually follow traumatism. In only three cases has systemic infection followed cutaneous lesions. The alimentary tract is not, they think, a source of direct infection, though in one or two cases changes were found post mortem in Peyer's patches with enlarged mesenteric glands. In the skin the condition spreads by contiguity, the lymph nodes not being affected.

In the lungs the parts first affected are the bronchi, followed by patches of broncho-pneumonia. Pleurisy and enlarged mediastinal glands often ensue. From the lungs the mould reaches the bloodstream and then secondary foci are found throughout the body. The muscles, bones, and subcutaneous tissue are all apt to be involved. The lesion is a round-celled infiltration with giant cells and polymorph leucocytes. In the viscera there are found nodules like those of tuberculosis and also small and large abscesses.

The characteristic lesions produced by the blastomyces are cutaneous ulcerations, deep and superficial abscesses, and tubercle-like nodules in the viscera. In the skin one may find pustules or ulcerations or abscesses. The abscesses may originate in the skin or the subcutaneous tissues, or in muscles, bones, or viscera. They may contain as much as a quart or more of pus, thick and tenacious. In all these abscesses the blastomyces can be obtained and demonstrated either by mixing with a 20 per cent. solution of sodium hydroxide, or by staining with hæmatoxylin and eosin or polychrome methylene blue.

The bone affections are osteomyelitis, periostitis, and arthritis, and the condition has been found in ribs, clavicle, sternum, bones of skull,

and long bones. In the latter the tendency is for the epiphyses to be attacked.

In the respiratory system—the primary seat of infection—one sees acute laryngitis, bronchitis, broncho-pneumonic patches in the lung and pleurisy with effusion, and often thickening of the pleura to a remarkable degree. The patches in the lung are found first in the upper lobe, and usually spread widely throughout both lungs, yet often give rise to few, if any, physical signs, and thus resemble miliary tuberculosis.

As regards other organs, foci are common in the spleen, liver, and kidney, sometimes in the suprarenal and pancreas, and in 4 of the cases recorded abscess of the prostate occurred. The history at the outset is vague. The condition often sets in with an ordinary cold in the head, or an infection of the upper respiratory tract. When the disease has involved the lung tissue there is pain in the chest, fever, dyspnoea, cough, and expectoration of bloody and purulent mucus. When the condition has lasted for some time loss of strength, emaciation (in some cases extreme), irregular fever, rapid pulse, and occasional chills and sweats occur. In all these cases the lung was primarily affected, and the mould found in the sputum. The blood shows a secondary anaemia with a leucocytosis, the maximum of the recorded cases being 30,000 per cm. Myelocytes were sometimes present, and the mononuclears were relatively increased.

Diagnosis.—The condition not being a common one is not readily recognised, and has to be differentiated, according to Stoher, from epithelioma, tuberculosis, and syphilis. Tuberculosis is more prone to cavity formation and hæmoptysis. The tuberculin reaction is absent, and in blastomyces the mould is always readily demonstrable in the sputum. The hard indurated character of the pustules of blastomyces, followed by abscesses, may readily be mistaken for gummata, all the more as both syphilis and blastomycosis improve under iodide of potassium.

The prognosis in blastomycosis is very bad, the mortality of the recorded cases being 90 per cent. Stoher is of the opinion that the large mortality is accounted for by a failure to recognise the condition early enough (there were marked evidences of healed lesions in the post-mortem cases), and that early and efficient treatment might have succeeded in curing a number.

The illness is usually prolonged, and in this series of cases varied from 4 months to 2½ years.

The important part of the treatment of this disease consists in improving the hygienic surroundings of persons likely to be attacked by these mould spores.

Potassium iodide in large doses has been beneficial in some cases, and X-rays also met with some success in the cutaneous lesions.

Vaccine treatment, by injecting some filtrate of old blastomycetic cultures, Stober thinks will, in the future, be a valuable therapeutic help.

ACIDOSIS.

The important subject of acidosis is discussed from various points of view in a number of recent papers. Henderson, in the *Canadian Medical Association Journal* (May 1914), treats of it from the biochemical view. Sellards, in the *Johns Hopkins Hospital Bulletin* (April 1914), writes on a clinical method of studying the titratable alkalinity of the blood and its application to acidosis, and again, in the May number of the same journal, has a paper on the "Essential Features of Acidosis and their Occurrence in Chronic Renal Disease."

Henderson points out that acidosis or acid intoxication is not a proper diagnosis. Acidosis is really a chemical fact, to be ascertained by chemical means. He shows how from a chemical point of view it is very difficult indeed to produce acid intoxication in the body—too many natural defences against it are present. There is a constant change of tension and a loss of CO_2 . This is one defence. Again, any tendency to acid intoxication tends to convert the Na_2HPO_4 of the blood-stream into the acid salt NaH_2PO_4 , and in addition the kidney constantly removes acid from the body. He comes to the conclusion that the cause of the condition or symptoms is a decrease in the fixed bases, in particular of calcium. This latter suggestion he throws out, because coma may come on relatively quickly even when patients are taking large doses of bicarbonate of soda, and even when the urine is alkaline.

In his first paper Sellards discusses the titratable alkalinity of the blood, the best methods for studying it, and the application of the method to questions of acidosis. By titratable alkalinity is meant the behaviour of the blood with indicators towards acids and bases. He has devised a method with phenolphthalein as an indicator, to which all normal sera would give an alkaline reaction, and pathological sera a distinctly acid one. With this indicator he has made numerous observations *in vitro*, by producing experimental acidosis in animals, and by investigations on clinical cases of diabetic coma, chronic renal disease, and pernicious anemia. In his paper he describes very fully his method and its application, and forms certain conclusions.

1. Changes in the titratable alkalinity of the blood occur which give rise to distinct qualitative differences in the reaction of normal and pathological sera to phenolphthalein.

2. Definite changes in the titratable alkalinity occur in experimental and spontaneous acidosis, in certain nephropathies, and in some anemias:—

3. Changes in the titratable alkalinity are accompanied by corresponding changes in the tolerance of the body to fixed bases.

4. The parallelism between the diminution in titratable alkalinity and the increase in tolerance to fixed bases in diabetes and in the nephropathies affords crucial evidence that this increase in tolerance is due practically altogether to a deficit of the body in alkalis or alkali-yielding substances.

Sellards, in his second paper, extends his previous observations, and discusses the features of acidosis in general, and particularly their occurrence in chronic renal disease.

He defines acidosis as a condition in which there is a diminution in the body of fixed bases, or in substances which give rise to fixed bases. All cases of acidosis as it occurs in different diseases have certain common features—

1. An increase in the tolerance of the body to fixed bases.
2. A diminution of the titratable alkalinity of the blood-serum.
3. A diminution of the carbon dioxide of the blood.

These signs in acidosis can be readily demonstrated—the second by the method of studying the reaction of the blood-serum to phenolphthalein as described in his first paper, and the first by studying the effect of giving sodium bicarbonate on the reaction of the urine. In a normal individual about 5 grams of sodium bicarbonate will render the urine alkaline in about 3 hours; in abnormal cases large quantities will require to be given before an alkaline reaction is obtained. And in this way the amount of deficiency in acidosis cases can be ascertained.

A deficiency of 20 grams can be detected by examining the blood, but no symptoms are produced—of 40 grams causes more marked change in the behaviour of the blood, but no dyspnoea, even on exertion. When the deficit reached 70 to 80 grams, 3 of his patients showed dyspnoea, which persisted in 2 of them even when at rest in bed. Two cases in a state of air-hunger and partial coma were relieved by the injection of 130 and 160 grams respectively. He thinks that in these 2 cases this amount of deficit would have been the immediate cause of death, and that one may assume that such quantities approach the limits which would be fatal in the depletion of the body in fixed bases. From the clinical observations of his renal cases he considers that an acidosis of high grade occurs in the uræmia of acute and of chronic diffuse nephropathy. The acidosis is not a terminal event, for it is often present (as ascertained by the phenolphthalein and sodium bicarbonate tests) in relatively high grade many months before the development of uræmia. It represents the effect rather than the cause of the renal lesions. Some of the toxic symptoms of uræmia are due, not to the presence of a toxin, but to the absence of a normal constituent of the blood—the carbonates. He considers, therefore, that bleeding in these cases will only cause a still further diminution of substances already very deficient in the blood. The bleeding would be beneficial if bicarbonate of soda were injected at

the time of bleeding. The coma in some of these cases of uræmia can be relieved by the injection of bicarbonate. The giving of the normal carbonate is unnecessary and inadvisable, and the administration of bicarbonate may be continued until the urine becomes alkaline, even though extensive renal lesions are present.

POLYCYTHEMIA AS A DIAGNOSTIC SIGN OF DUODENAL ULCER.

Friedman (*Med. Record*, New York, 16th May 1914) draws attention to the value of this sign. He points out that we have no symptom or sign pathognomonic for duodenal ulcer. The differentiation between duodenal ulcer on the one hand and gastric ulcer and appendicitis on the other is always very difficult; hunger pain and radiological findings are not always certain signs.

Friedman bases his claim for a polycythæmia in duodenal ulcer upon sixteen cases, all of which came to the operating table, and in all a duodenal ulcer was found. The blood in all the cases was carefully examined. The number of red blood corpuscles varied between $4\frac{1}{2}$ millions and 6,700,000, and the hæmoglobin between 70 per cent. and 120 per cent.—average 90 per cent. In gastric ulcer and chronic appendicitis there is usually a mild degree of anæmia. The polycythæmia in some of his cases persisted for a time after operation. He is anxious to have his results corroborated, and already several surgeons have operated for duodenal ulcer with polycythæmia as a guide.

E. M.

SURGERY.

UNDER THE CHARGE OF

J. W. STRUTHERS, F.R.C.S., AND D. P. D. WILKIE, F.R.C.S.

CLINICAL OBSERVATIONS ON SO-CALLED NASO-PHARYNGEAL POLYPUS.

MOURE AND CANUET (*Revue de Chirurgie*, June 1914) describe two cases of naso-pharyngeal polypus, and describe the operation employed for the removal of the tumours. In commenting on these and other cases they have seen, they state that these tumours never arise, as they are said to, from the basi-occipital, *i.e.*, the roof of the naso-pharynx, but that they spring from the choana, the sphenoid, the internal pterygoid plate, or the roof of the nose. It is necessary, clinically, to distinguish two types or varieties, which spread differently and require different methods of attack for their removal. The first and common type springs from the choana or sphenoid, and spreads rapidly to the naso-pharyngeal space and into the nose. The second and rarer type arises from the pterygoid plate, often in the pterygo-maxillary fissure, and spreads into the nose and towards the neck, behind the superior maxilla, flattening the antrum of Highmore without breaking through

the posterior wall. It is important to recognise this second type, because it does not tend to enter the naso-pharynx, and it is essential to remove the posterior wall of the antrum to get access to it. Both varieties tend to have a narrow pedicle and never have a broad sessile attachment, as is described in some text books. As a rule the tumours do not contract adhesions to surrounding parts, and in the majority of cases they are simple in nature and do not recur after complete removal. Sarcomatous degeneration may take place, but is exceptional. They are found exclusively in males, and almost invariably before the age of twenty.

Three methods of removal are recommended. In the case of small tumours of the common type, presenting in the naso-pharynx, the galvano-caustic snare should be used. In larger growths of the same kind the soft palate may be split and the tumour avulsed with special strong forceps. In dealing with the rarer tumours, which spread out behind the antrum, Moure and Canyot recommend that the nostril on the affected side be turned aside, the front of the antrum exposed to beyond the canine fossa, and the antrum opened up by removing its anterior, inner, and posterior walls, without interfering with the floor of the orbit. Free access is gained in this way to the pedicle of the tumour, which is then dealt with by avulsion, and little or no deformity results.

VISCERAL PLEURECTOMY FOR CHRONIC EMPYEMA.

Mayo and Beckmann (*Ann. of Surg.*, June 1914), in considering the operative treatment of chronic empyema, review the various methods used, and recall the fact that Fowler in 1863, and Delorme in 1884, suggested and practised the removal of the tough fibrous visceral pleura in these cases, maintaining that the lung is often capable of expanding if this layer is removed. Mayo and Beckmann have had such discouraging results from operations of the Estlander-Schede type that they have gradually taken up the decortication method, and they report some successful cases. The first was that of a six-months' old empyema in a man of twenty whose right lung was almost entirely collapsed, leaving an enormous cavity from the diaphragm to the clavicle. Through an opening large enough to explore the cavity the visceral pleura was removed from the entire lung. As the result the lung eventually expanded and filled the cavity, and the patient made a perfect recovery. A second case of the same character is reported along with others in which smaller cavities were present and were treated in a similar manner with success.

Mayo and Beckmann state that the operation is attended by much less shock than the Estlander-Schede operations, but they do not maintain that it can replace these procedures altogether, for the lung will not always expand after decortication. They advise that patients

should first of all be carefully prepared for a severe operation in every possible way. Drainage of the cavity should be established at the most dependent point if this has not already been done. Autogenous vaccines should be administered, and the cavity should be regularly irrigated with a weak iodine solution. Improvement following these measures is often considerable, and allows the major operation to be done with better prospects of success. In doing the pleurectomy free access is necessary. The thickened pleura is incised posteriorly right down to the lung and the entire visceral pleura removed, working from the first incision. If the operation appears likely to be too severe it may be done in stages, and if the resulting expansion of the lung is insufficient to fill the cavity, a resection of the ribs can be done later with much greater prospect of success than if no pleurectomy has been carried out.

THE FUNCTION OF THE GASTRO-ENTEROSTOMY OPENING IN CASES OF PERMEABLE PYLORUS.

Professor Hartmann (*Ann. of Surg.*, June 1914) has arrived at the conclusion that a gastro-enterostomy opening does not close when the pylorus is patent, as is usually supposed. He has collected a number of recorded cases of anatomical closure of the anastomosis and finds that in only four was there a patent pylorus. His study of these records leads him to conclude that obliteration of the stoma is in no way associated with the degree of permeability of the pylorus, but that it sometimes results from cicatrization of a peptic ulcer, and that the technique used has a direct bearing on the subsequent result, for a large proportion of cases of closure occurred where a button had been used to make the anastomosis. On the other hand, a number of cases are on record where the stoma has been found working years after operation, the pylorus being at the same time free from disease. In order to clear up the doubts on the matter, Hartmann has made experiments on dogs and careful radioscopic examinations on patients. His experiments showed that if the anastomosis is made in the pyloric antrum, it continues to functionate irrespective of the patency of the pylorus: whereas if it is made towards the cardiac end of the stomach it soon ceases to functionate. The radioscopic examinations confirmed the experimental observations, for in 19 patients who were examined from 1 to 11 years after operation, and who had no pyloric stenosis or gastric stasis at any time, the food was found to leave by the anastomotic opening in 11 cases, by the stoma and pylorus in 7 cases, and by the pylorus alone in 1 case. Hartmann points out that screen observations are absolutely necessary to follow accurately the course taken by the food. If reliance is placed on the inspection of radiographs alone, faulty conclusions may easily be arrived at. His custom has always been to make the anastomosis in the pyloric antrum, near the pylorus,

and he maintains that if this practice is followed, no fear need be entertained of the stoma closing because the pylorus may be patent.

THE SURGICAL TREATMENT OF ACUTE GONORRHOEAL EPIDIDYMITIS BY EPIDIDYMYTOMY.

Bayard Clark (*Ann. of Surg.*, May 1914) writes favourably of his experience of treating acute epididymitis by incision and drainage. He has treated 21 cases, and has found that incision gives immediate relief from pain, and that the patients are able to be up and about much sooner after incision than after the usual expectant methods of treatment. His plan is to give a general anæsthetic, to make an incision $1\frac{1}{2}$ ins. long over the prominent part of the swollen epididymis, and open the tunica vaginalis. The fibrous covering of the epididymis is next incised for half an inch, and a probe passed gently into the epididymis to allow any pus to escape. In a third of his cases pus was found containing the *gonococcus*. A small drain of rubber tissue is inserted into the epididymis whether pus is found or not, and the wound closed round it. In 48 hours the drain can be removed, and the patients can be discharged from hospital on the fifth or sixth day after operation.

THE FREQUENCY OF CARCINOMA OF THE APPENDIX.

MacCarty and McGrath (*Ann. of Surg.*, May 1914) have examined one series of 5000 cases, and a second of 3032 appendices removed in the Mayo clinic, with a view to determining the frequency of the so-called carcinoma of the appendix. In the first series they found 22 cases, and in the second 18, so that the condition appears to occur with fair regularity. It invariably occurred in appendices which had been partly or completely obliterated, and in the great majority of cases was only discovered by careful examination in the laboratory. In none of the cases was the lesion of any apparent clinical significance, and extension beyond the appendix and metastasis were never observed.

J. W. S.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

G. H. MELVILLE DUNLOP, M.D., AND A. DINGWALL
FORDYCE, M.D.

EXPERIMENTAL RICKETS.

KOCH (*Berlin. klin. Woch.*, Nos. 7, 17, 18, 19) discusses this subject at considerable length. When microbes enter the blood-stream they tend to be deposited chiefly in three organs—the liver, spleen, and bone-marrow, and, according to Orth, changes in the bone-marrow resulting

from infective processes are as constant as those in the spleen. There is, however, a marked difference in the morbid change in the bone-marrow according as the patient is a child or an adult. In childhood the bone-marrow is much more readily injured and at the same time is more suited for enmeshing bacteria. Certain parts of the bone are more prone to invasion by bacteria than others, particularly the marrow of the metaphysis, as witness syphilitic osteochondritis, acute osteomyelitis, and bone tuberculosis in childhood. These diseases produce gross changes, but it has also been found that the bone-marrow of children in cases of transitory infection, such as measles, bronchopneumonia, and gastro-enteritis, often is the site of invasion by bacteria, and that still more frequently histological changes occur in the bones, chiefly at the junction of cartilage and bone. These changes are of the nature of early rachitis. Is it then possible that the changes in rachitis are the result of an infective process?

In the bone-marrow of a young animal during an acute infection there occurs not only rapid proliferation of bacteria, but also destruction of bacteria, and as the death of the animal may occur at different stages, so the number of bacteria found may be great or small. Along with this, inflammatory changes occur in the bone and in the periosteum. The marrow cavity increases in size, the size of the cartilage and bone-marrow on transverse section becomes greater, while the true proliferating cartilage zone becomes smaller.

With these results before him the author proceeded further by injecting, intravenously, young dogs, of 8 to 12 weeks in age, with cultures of various bacteria.

The Acute Stage.—The results varied with the different bacteria used. With the human streptococcus (*streptococcus longus seu erysipclatis*) a characteristic illness supervened, especially joint troubles, with in many cases enteritis. The animals became feverish and lost appetite. In individual animals there was considerable difference in the symptoms.

When the *streptococcus longus* is employed for injection the cocci disappear rapidly from the blood of the young dog and settle in the bone-marrow. Here they cause degenerative changes and not suppuration. Other organs in the body are not affected. The joints become filled with serous fluid, and the inflammatory process affects also the soft parts, such as muscles and tendons round the joints and the ends of the bones. The fluid in the joint is sterile, while sometimes bacteria are still discoverable in the epiphysis, and the ends of the bone are the primary sites of disease.

Infection, by injection, by these bacteria does not cause a general infection in young dogs, but their virulence is still sufficient to enable them to gain a footing in the bones, and especially in the marrow of the metaphysis, and to do local damage there. Pneumococci and staphylo-

cocci act like streptococci. The physiological hyperæmia of active growth, the vessel peculiarities in the marrow and in the periosteum, favour the deposition and growth of germs, so that these parts are sites of election.

Microscopically it is found that an inflammatory reaction occurs at these spots, and a chronic disturbance of endochondral ossification results. In the attempt at once to grow and to return to a normal condition, the formed bone loses calcium salts, and these salts are only irregularly and sparsely deposited in the developing cartilaginous and bone tissues. As Kassowitz has shown, hyperæmia by itself is capable of producing this.

The Chronic Stage.—Still more interesting are the disturbances and deformities resulting in the chronic stage owing to their resemblance to the changes in rhachitis.

Experiments were made on 100 dogs, 30 of these being controls. The dogs were kept in the "Robert Koch" Institute, and every precaution as regards cleanliness was seen to. The cage of each dog was 3 metres long and $1\frac{1}{2}$ broad. "The cage led through a closable door to a play-court enclosed with wire-netting." All the dogs were fed alike—at 8 o'clock A.M. bread and milk, at 4.30 P.M. cooked meat, the bouillon from this with kitchen salt added, potatoes cut and crushed, and dog-biscuits softened in boiled water. Fresh water to drink was given freely. Three out of the 30 control dogs developed spontaneous rhachitis.

Clinical History and Pathology.—After the acute stage was past the animals returned to their previous condition of good health: they ate well and ran about freely. A few, however, appeared sickly, and lay quiet and declined to move. Soon all developed abnormality in gait, changes in the appearance of the face, and thickening of the bones, especially at the epiphyses. These changes gradually became more marked.

Deformity of the head and face occurred early. In the course of time the deformity and bending of the bones in many cases became so extremely marked that the dogs could only move about with difficulty. In some cases, however, even where there was great deformity, the animals were quite active. In most cases, however, the long bones kept their shape, but the whole bone became thickened.

Not only the bones but also the soft parts showed changes. Thus the musculature often became poor, and specially in the forelegs. In many cases, instead of walking on their toes the animals walked on their whole foot and even on the ends of the radius and ulna, the foot becoming placed at right angles to the long bones.

In most cases there was no marked tenderness, but in some this was present. In six animals a form of spastic paralysis of the hind legs was present, which was probably due to changes in the spine.

The bone changes were not of a progressive nature but tended to heal.

The bone changes affected the whole skeleton, but the degree and localisation of the changes varied considerably in different animals. Comparing the skeleton of an animal at the zenith of the bone changes with that of a control dog, it is seen that while the skeleton of the control is generally slim, with hard, regular, long bones, the bones of the affected animal are coarse and hypertrophied, the ends of the long bones greatly thickened and club-shaped. The shaft of the diaphysis is also hypertrophied and is thick and short. Around the bones is a thickened hyperemic periosteum which is adherent to the underlying bone, especially at the ends.

The bone-marrow is also hyperemic, deep red in colour, and entirely fills the enlarged marrow space. On section it is found that the delimitation of bone and cartilage, instead of being sharply defined, is irregular and broken up. Only occasionally is the proliferation zone in the cartilage greatly extended. The junction between epiphyseal and diaphyseal cartilage is very loose, and sometimes separation of the two occurs spontaneously.

Changes in the ribs are particularly well marked. They are thickened, hypertrophied, and flattened: they lack normal curvature, and have thickenings, sometimes as large as cherries, on their inner surfaces.

The short flat bones are also sometimes greatly changed. The pelvis, the scapulae, the cranium, and the spine all participate in the changes.

During the active stage of the condition all the bones were soft and easily cut and readily broken. Their tissue appeared rarefied, porous, and like pumice-stone.

The bones were very light, and this was specially marked when contrasted with their condition of hypertrophy.

Fractures were common. An interesting condition was the doubling of the cortex, which also occurs comparatively often in cases of human rhabdomyosarcoma.

When the condition was entirely healed the bones became extremely hard and even eburnated.

In the great majority of cases the changes in the skull were very characteristic. From above it appeared small and narrow. The bones of the face and the jaws were excessively developed and thickened. The entire skull was of the dolichocephalic type. The general appearance was one of little expression, coarse and ugly. Frequent and characteristic changes were the symmetrical hypertrophies of the jaws. The posterior part of the skull was often porous and like pumice-stone, with patches of thin rarefied bone, and in some cases parchment-like patches closely resembling cranio-tabes as it occurs in man.

Of special interest were the changes in the teeth. The alveoli were larger than normal, their walls soft and porous, and the teeth only loosely fixed in them. In some cases the teeth fell out. In some cases the enamel on the teeth was defective, even to the extent of being almost entirely absent, and extensive dental caries was occasionally present.

Changes in the skeleton caused diminution in the size of the thorax. This was due to—(1) shortening of the diaphyses of the ribs; (2) flattening of the ribs; and (3) cracking of the ribs near the costo-chondral junctions. The sternum was consequently sunk inwards.

The spine was markedly kyphotic and the position of the pelvis altered.

The author holds that the true rachitic changes in the bones, which are present in the fully-developed condition, are the end-products of an imperfect and frequently-interrupted process of regeneration which occurs primarily at the boundary of cartilage and bone—injured by infection—at the neighbouring marrow and the rest of the bone, during the period of growth of the animal.

The bony changes vary very much even in different bones in one animal according to the stage of the process—according as it is in the florid stage or progressing towards healing. One of the earliest signs of the florid stage is a well marked rachitic rosary, this rosary being usually most marked at the 8th, 9th, and 10th ribs. The internal organs were entirely unaffected, and the condition was, above all, one affecting normal ossification, and macroscopically and microscopically closely resembling rachitis.

Were these bony changes due to the infection or to other causes? The acute stage certainly was due to the infection, but it is not so easy to show that the chronic osseous changes and deformities were.

Between the acute stage and the development of visible osseous changes there was an interval during which the animals appeared well. Spontaneous rachitis is not uncommon in dogs, and it is open to the sceptic to say that in these cases the condition was spontaneous rachitis following on an acute disorder.

But although, as has been noted above, there was an interval between the acute stage following infection and the development of visible osseous changes, during which the animals appeared well, this interval was a clinical one. Histologically, it was found from the examination of bones from various animals at different times that the changes were continuous and consecutive. Also the unanimity of results was very striking. The chronic rachitic changes in the osseous system are then to be held in the main as the results of a long-continued infection.

A great many causes have been put forward as accounting for the development of rachitis in animals, none by itself entirely satisfactory—

a lop-sided diet, lack of calcium salts, disturbances of internal secretion, want of fresh air, of movement. Undoubtedly domestication favours the development of the condition. Another important point to be noted is that of mixed or secondary infections.

When, succeeding an acute infection, normal ossification has been interfered with, for a long time afterwards the growing bone is a vulnerable point, and chronic enteritis, broncho-pneumonia, and other conditions common in the child may serve to keep active an irritative condition in the epiphyses and hinder the process of healing. Secondary infection plays an important part in rhachitis. How great its influence is, or what intercurrent illnesses are of importance in this respect, it is hard to say. But it is always bacterial processes and never metabolic disturbances which maintain the disorder of ossification and hinder its healing.

Animals which have not the opportunity of moving about freely, but are shut up in small cages, are much more liable to suffer from disorders than free animals. Domestication and want of care predispose to and favour the development of rhachitis, but the primary cause is always infection—once or frequently repeated—which is very common among animals kept in confinement.

A. D. F.

DERMATOLOGY.

UNDER THE CHARGE OF

W. ALLAN JAMIESON, M.D., AND R. CRANSTON LOW, M.B.

THE SYMPTOMATOLOGY AND TREATMENT OF SOME VARIANT FORMS OF LICHEN PLANUS.

ALTHOUGH in the majority of cases lichen planus occurs in its typical form, there are several varieties of the disease which are not so well known. Sutton (*Journ. Med. Assoc.*, 17th January 1914) draws attention to these rarer manifestations of the disease. The most frequent aberrant type is the annular eruption consisting of more or less typical papules arranged in rings. Occasionally the rings are incomplete, and in some cases the lesions are very large, the rings formed by enlargement of a single papule giving an appearance clinically very like granuloma annulare. Numerous cases of linear lichen planus have been recorded, the papules usually extending in a more or less straight line from the buttock down the back of the thigh to below the knee. Various explanations have been given of the peculiar distribution, *e.g.*, that the eruption occurs along Voigt's lines, along the distribution of peripheral nerves, or along the course of the superficial veins. Sutton thinks the most likely explanation is that the eruption follows scratching or other local injury to the skin, as it is well known that the eruption in all

systemic infections, *e.g.*, variola, is liable to occur in areas where there is pressure or irritation of the skin.

Whilst the eruption is nearly always dry, cases of vesicular or even bullous lichen may occur, the vesicles and bullæ developing from pre-existing papules. Colecott Fox suggested that these might be due to the arsenic given in treating such cases. Suppuration may occur, and is due to a secondary staphylococcal infection.

Lichen verrucosus is fairly common, especially on the lower limbs, the lesion having an irregular wart-like covering. All these forms of lichen planus have to be distinguished from the so-called lichen chronicus simplex (Vidal), which is generally considered to be a circumscribed pruritus which leads to scratching and lichenification of the skin.

There are still two other conditions which are closely allied to lichen. Lichen obtusus corneus (Brocq) (prurigo nodularis (Hyde)) shows a few scattered lesions beginning as papules and enlarging later, lichenoid in type and very itchy. These increase in size, to form hard, dry, greyish or yellowish dome-shaped nodules. The general opinion seems to be that these lesions are not true lichen planus lesions. The other type of eruption resembling lichen is that known as lichen ruber moniliformis (Kaposi), where the lesions are large, raised, nodular, and arranged in rows like the beads in a necklace. This variety is very rare, and it is doubtful whether it is a true lichen or not.

In the treatment of lichen Sutton considers mercury much superior to arsenic. He gives it intramuscularly in the gluteal region. He prefers the soluble to the insoluble preparation because of the greater ease with which the effects can be controlled. Of the bi-chloride $\frac{1}{12}$ to $\frac{1}{8}$ gr. may be injected once daily. In the hypertrophic type the Hg may be alternated once a fortnight with arsenic or arsenic and iron. Alkaline diuretics, with or without bromides, are often beneficial to lessen cutaneous irritability. Sutton has tried salvarsan and neosalvarsan without benefit. He has found the following ointment good as a local antipruritic:—

R Phenol	℥j v-x.
Menthol	gr. v-x.
Ung. hydrarg. ammoniac.	℥ii.
Ung. zinci oxidi	℥ii.
Adep. linae anhyd.	℥iv.
Aq. calcis ad satur.	i. ung.

In addition to an ointment he recommends an ordinary calamine lotion to which has been added phenol ℥xv, and tinct. picis carbon. co. ℥ss-v to each ℥vi. If the itching is excessive the following combination has been found useful:—

R Menthol	℥iss
Thymol	℥ii.
Chloral hydrate	℥i.
Chloroform	℥ii.
Ol. eucalypti	℥ii.
Ol. gaultheriæ	℥iv.
Alcohol	ad ℥viii.

For the thick scaly hypertrophic forms Sutton recommends X-rays and freezing with CO₂ snow.

THE TREATMENT OF SCABIES.

The ordinary sulphur treatment of scabies is occasionally followed by complications, *e.g.*, albuminuria, etc., and unless the sulphur is applied for two or three days a certain cure cannot be obtained. In order to obviate these risks and shorten the period of treatment Ehlers of Copenhagen (*Paris médicale*, 7th March 1914) recommends the following procedure:—The patient washes himself in a warm bath for 20 minutes with neutral soap (not green soap), then he is rubbed with the following ointment for half an hour:—A solution of potass. sulphurata (33·3 per cent.) is made by dissolving 2 parts of a 50 per cent. sol. of potass. hydrate in 1 part of sulph. sublimat. A good deal of heat is produced, therefore care must be taken in mixing. Vaseline. alb. and lanol. anhydr. aa 225 grms. are mixed thoroughly. To these are added gradually 375 grms. of the above 33·3 per cent. sol. of potass. sulphurata. To this is added hydroxide of zinc (made by dissolving 28 grms. zinc sulphate in 40 grms. of a 20 per cent. sol. sod. hydrate) and 5 grms. benzaldehyde, and liquid paraffin up to 1000 grms. In the above ointment the sulphur is in solution and penetrates into the burrows and kills all the acari. The ointment is left on and the skin sprinkled with salt and the patient dresses. Twenty-four hours later the patient takes a bath and puts on clean clothes. There is no necessity to disinfect the clothing. Ehlers claims that the cure is safe, efficacious, and cheap. He has never seen a recurrence of the disease after this form of treatment. Its only inconvenience is the smell of sulphuretted hydrogen. He attributes its success to the fact that the sulphur is in solution, and that the burrows are made vesicular by the treatment and enlarge probably by the liberation of sulphuretted hydrogen by contact with the acid sweat and contents of the burrows.

STONES IN THE SKIN.

Milian (*Paris médicale*, 7th March 1914) reports a case of calcareous masses in the skin and refers to other similar cases. Calcareous granulomata of the skin exist in two forms—(1) the localised form, where there is a single abscess or gummatous-looking lesion with creamy white

contents, consisting of calcareous grains; (2) the generalised form, where the lesions are multiple and occur usually on the fingers, elbow, hip, knee, etc. The generalised form is simply a more advanced stage of the localised, and, according to the duration of the process, shows more or less hard masses in the skin. The slowly progressing cases lead secondarily to fibrous retractions and muscular atrophy of the affected limb, and when the fingers are affected a condition like sclerodactyly is produced. In Milian's case X-ray photos showed that the skin and tendons were riddled with small calcified masses, varying in size from a pin-head to a pea. These interfered with the movements of joints and in the fingers caused complete ankylosis. Microscopically a piece of skin containing a calcareous nodule showed in the superficial part of the true skin inflammatory nodules with lymphocytes, plasma and mast cells, with a good deal of oedema. In the centre of the nodules were numerous very dilated capillaries, of which the endothelium showed marked proliferation with formation of giant cells. In the deeper parts there were dilated capillaries the proliferated cells of which had formed giant cells, into which calcium carbonate had been precipitated, forming a tumour which was practically an endothelioma.

TREATMENT OF ACNE WITH YEAST AND BORIC ACID.

Yeast taken internally in various forms has been used for a considerable time in the treatment of acne. As a rule the treatment is effective only for a time, recurrence being the rule. Buchholz (*Dermat. klin. Woch.*, 2nd February 1914) employs usually a mixture of equal parts of dried yeast and finely powdered boric acid. Sometimes he employs two-thirds yeast with one-third boric acid. In order to assist the absorption of the powder the affected parts are first rubbed with boric ointment; then the above-mentioned powder is well rubbed in. One application each day is sufficient. Buchholz claims that under such treatment the lesions gradually disappear, and that if the treatment is persisted in a permanent cure will result.

TREATMENT OF SKIN CARCINOMATA WITH SUNLIGHT.

Seelye (*New York Med. Journ.*, 7th February 1914) recommends sunlight for the treatment of superficial carcinomata (rodent ulcers) where X-rays or radium are not available. He uses concentrated sunlight focussed on the growth by means of an ordinary magnifying glass such as can be purchased under the name of a "reading glass." The light is focussed directly on the lesion for ten or fifteen minutes at a sitting. If a scab is present, the rays are concentrated on it till the patient complains of burning, then the focus is lengthened so as to cover with the rays an area an eighth of an inch or more beyond the scab. Every few minutes the burning is again induced for a second.

not to the degree of cauterisation. After about ten minutes' treatment the scab will look darker, and during the next few days will become more prominent and loosened. Treatment should be given every day or two till the scab can be easily removed, leaving a raw bleeding ulcer. Then is the time for a powerful application of the rays. First apply a few granules of cocaine in powder directly to the raw sore and after three or four minutes a treatment so strong as almost to cauterise the base of the ulcer may be borne, to be alternated with continued milder applications for about 15 minutes. Milder treatments thereafter at intervals of from three to seven days through the scabs or immediately after their shedding will usually complete the cure within from three to six weeks. A scarcely visible scar is left after treatment. Seelye thinks that the result is due either to the intense heat or to the very rapid ethereal vibrations set up by the light rays.

BURNS IN CHILDREN AND THEIR TREATMENT.

Apart from burns due to children falling into the fire, upsetting boiling water over themselves, etc., Savariaud (*Journ. de méd. de Paris*, 28th February 1914) draws attention to the frequency with which children are burnt by the application of too hot a poultice. He recommends that the poultice should be applied to the nurse's forearm, and then not just for a second but for a minute or two, before being applied to the child's skin. In the same way, when testing the temperature of a hot bath, it is not sufficient to dip the finger into the water; the whole forearm should be kept in it for some time. Burns of the first degree do not call for much treatment, but in burns of the second and third degrees the danger is secondary infection. It is necessary to disinfect not only the burnt area but also the surrounding skin. Instead of giving the child a general anæsthetic and cleaning up the whole area with soap and water and antiseptics, it is sufficient to paint the whole part with tincture of iodine. Whilst it is easy to make the recent burn aseptic, it is difficult in young children to keep it so, especially if anywhere near the pelvis. The blebs, etc., should be opened, and instead of a dry dressing, which causes pain and bleeding every time it is changed, Savariaud recommends the following antiseptic and soothing ointment.

Holston's Preparation.

R Argenti nitrat.	āā 1 part
Antipyrine	5 parts
Vaselini	āā 50 "
Lanolini	

This is spread on cloths and applied. In cases of severe burning, where after the sloughs have separated it is desired to skin-graft, it is necessary to stop using the above ointment and apply a dry dressing,

not of aseptic gauze but of boracic lint, applied with the smooth side towards the wound. Where possible, adhesions and retractions should be avoided by keeping the parts stretched, but where the wounds will not heal in that way, then they should be allowed to heal up even with the limb in a flexed position, and the surgeon called in later to perform a plastic operation.

R. C. L.

MEDICAL JURISPRUDENCE.

UNDER THE CHARGE OF

HARVEY LITTLEJOHN, F.R.C.S.

A CASE OF BENZINE HABIT.

SCHMELZ (*Wien. klin. Woch.*, No. 1, 1914) records the case of a 12-year-old girl who became addicted to the drug. Her mother earned her living by cleaning gloves, in which she used a large quantity of benzine. The girl used to pour it on her handkerchief and inhale the vapour. It produced a certain degree of "drunkenness," in which she saw beautiful landscapes, finely-clad people, animals, and heard voices. One day she was arrested by the police in the streets while in a more or less helpless condition, and subsequently recovered from the habit by means of hypnotic treatment.

Jaffé (*Munch. med. Woch.*, No. 4, 1914) has a paper on poisoning by benzine, and the post-mortem appearances produced by it in 11 cases, together with the results of experiments on animals.

His conclusions are as follows:—Benzine is almost wholly excreted by the lungs, and in the lungs extensive hæmorrhages are found—a result which was corroborated by animal experiments.

Benzine is only very slowly absorbed from the stomach, and in such cases of administration in animals necrotic and acute inflammatory areas are produced in the lungs, together with degenerative changes in the liver and kidneys. When benzine is taken into the stomach in human beings the chances of recovery are favourable owing to the slowness of absorption and the efficacy of washing out the stomach, even at a late period.

DIAGNOSTIC SIGNS OF DEATH FROM COLD.

Krjukoff (*Vrhljersch. f. gericht. Med.*, Bd. xlvii. 1914) has a paper upon this subject. He reviews the various appearances which have been described, none of which can be regarded as specific, and then discusses especially the significance of the erosions of the stomach which were first described by Wischniewsky, and to which, along with Ignatovsky, he ascribes great importance as a diagnostic sign of this form of death. Wischniewsky found these erosions in 91 per cent. of his cases, in numbers of 5 to 100 superficial erosions of varying size. Krjukoff also

attaches great importance to their presence, having found them in 44 out of 61 cases (72 per cent.), and contests the views of Reiskys that they have no diagnostic value owing to the frequency with which erosions in the mucous membrane of the stomach are encountered in other forms of death. The most frequent sign of death from cold is, however, the total absence of carbohydrates in the liver (glycogen and sugar), which is explained by the slowness of the death. If carbohydrates are found, then this indicates that an additional factor has operated in the case; in many instances, alcoholic poisoning.

TRANSVERSE RUPTURE OF THE AORTA AS A RESULT OF INDIRECT VIOLENCE.

Dohrn records the case of a young slater who fell 45 feet to the ground (*Zeitschr. f. Medizinalbeamte*, No. 7, 1914). He landed apparently on his left foot and two hands, since the left astragalus was comminuted and there was a double Colles' fracture. There were no external marks of violence on the trunk, but internally the arch of the aorta, where it passes over the vertebrae, was completely ruptured in a circular manner. In young people, owing to the elasticity of the cartilages and ribs, rupture of the lungs and heart from direct violence without external injury or fracture of the ribs is not uncommon, but such ruptures from indirect violence are rare. The explanation given by the author in this case is that the heart was thrown downwards and forwards, and by its weight tore itself away at the site where the aorta is most firmly attached.

SUICIDAL STRANGULATION.

The possibility of a person committing suicide by tying a ligature round the neck and without using any mechanical contrivance for tightening the ligature, such as by twisting it by means of a piece of stick, etc., has been frequently questioned. Not long ago in a trial for murder in England two doctors stated it to be impossible, with the result that a man was condemned to death, since the only alternative was that the case was one of murder.

Their opinion was based on ignorance of well-known facts in medical jurisprudence, and the following case recorded by Dugge (*Zeitschr. f. Medizinalbeamte*, No. 7, 1914) may therefore be of interest:—A widow, 72 years of age, was found lying dead in bed. At first it was thought to be a case of death from natural causes, but on closer examination a handkerchief was found tied round the neck so tightly that the fingers could only be introduced with difficulty between it and the skin. The handkerchief was knotted in front, and a curious circumstance was that over the handkerchief there was a linen band which encircled the neck twice and was tied with an ordinary bow in front. The post-mortem appearances were typical of death from violent asphyxia—well-marked

cyanosis, with numerous punctiform ecchymoses in the skin of the eyelids, forehead, cheeks, and neck. The cause of death was undoubted, and the only question came to be—Was it suicide or murder? The circumstances, which are always of prime importance in the consideration of this question in such cases, plainly indicated suicide—which the deceased's own statements to neighbours indicated was present in her mind on the day of her death.

TRAUMATIC RUPTURE OF THE LUNG WITHOUT FRACTURE OF BONES.

A man, 36 years of age, was compressed between the buffers of two railway waggons and sustained extensive ruptures of all the lobes of the right lung and of the bronchi close to the root of the lung. The case is exceptional owing to the age of the man. Absence of fracture of the ribs in such cases is common in children and young persons, but is extremely rare at adult ages, and in this respect the case is worthy of record (*Vierteljahr. f. gericht. Med.*, Bd. xvi. 1913) by the author, Dr. Tilp.

THE TEMPERATURE OF ORGANS IN THE BODY AFTER DEATH.

Professor Richter (*Arch. Sachverständigen Zeitung*, Nos. 11 and 12, 1914) records the results of his investigations upon this subject, which were instituted with the object of finding out whether such temperature measurements afforded reliable data for determining the time when death occurred.

The elucidation of this question may be of great importance in criminal cases, and more especially Taylor records some very striking instances in which the guilt or innocence of a party has depended upon the exact time of death.

There are, of course, numerous means by which an approximate opinion can be arrived at—the state of the body in regard to cooling, rigidity, post-mortem lividity, and the presence of putrefactive changes, but all of these post-mortem changes vary so much according to the individual, the cause of death, and other circumstances in each case that any opinion based upon them can only be approximate and within very wide limits. Revenstorff has suggested the determination of the freezing-point of exudates or of the cerebro-spinal fluid; Balbiard, the increase in length of a body after death, and again, the measurement of the increase in length of hair after shaving; Berger, in drowned persons, employs the fact of the body fat becoming rancid or decomposed into glycerin and fatty acids, and the degree to which this change has progressed; Ottolenghi suggests the determination of the kind of bacteria present in different stages of putrefaction; while Kratzer has proposed that the putrefactive products might afford satisfactory data for deciding the question.

Much was expected at one time from observation of the state of

digestion of the contents of the stomach, and at first sight such a means would appear to be reliable. But it is now known that there is the greatest variation in the time which various foods take to pass out of the stomach, and also that the rapidity of digestion varies very much in different individuals; while Ferrai has drawn attention to the further complication, namely, that post-mortem digestion of food may take place in the stomach.

With the view of discovering some more exact method of deciding the time when death took place, Richter has taken the temperature of individual organs of the body and noted the differences in the temperatures of the brain, liver, spleen, and kidneys, and also the rate at which cooling takes place in them collectively and relatively.

The method is simple and the liability to errors of observation is slight. His procedure was, immediately on opening a body, to introduce a thermometer into the organ through as small an opening as possible, so that the whole of the mercury and a part of the tube was embedded in it, care being taken that the surface of the thermometer, when introduced, was perfectly dry. The paper itself must be consulted for details, but Richter found that the brain cools much more rapidly than the other organs, and that his experiments afforded good ground for the belief that the cooling of the different organs and the differences in temperature between them offered a means of fixing the time of death as well as possibly also the nature of the cause of death.

FATAL POISONING BY ACETIC ACID.

Gesselewitsch (*St. Petersb. med. Zeitschr.*, No. 1, 1914) gives an account of a case in which a man while under the influence of alcohol drank an (unknown) quantity of acetic acid. He vomited blood when seen shortly afterwards, and hence the stomach was not washed out but magnesia was administered. Next day it was noticed that there was marked corrosion of the gums and pharynx, as well as of the skin at the corners of the mouth. He was unable to swallow and continued to vomit blood. Seven days later he brought up a tubular mass of mucous membrane, submucosa, and muscular tissue, the length of the mass being about five inches. Swallowing now became easier but vomiting continued. Gastrostomy was performed, but the patient died from exhaustion two months after taking the poison.

While cases of loss of the mucous membrane of the œsophagus are not uncommon after the swallowing of corrosive poisons, yet such a result after acetic acid is very rare, if not unique. Serbilatiew and Wladykin have collected respectively 709 and 479 cases of acetic poisoning, but in none of these did such a complication arise.

H. L.

NEW BOOKS.

Auricular Flutter. By W. T. RITCHIE, M.D. Pp. xii. + 144. With 107 Illustrations. Edinburgh and London: W. Green & Son, Ltd. 1914. Price 10s. 6d. net.

READERS of this *Journal*, of the *Quarterly Journal of Medicine*, and of *Heart* are aware of the honourable place taken by the author of this book in the new field of cardiology. In this monograph he brings together and largely extends much of the work in which he has been engaged in recent years, and at the same time places before us all that is at present known regarding "auricular flutter," the most recently differentiated of abnormal heart conditions. Many will be glad to have the clear description in the opening chapter of the atrio-ventricular conducting system, the jugular pulsations, electro-cardiograms, various kinds of extrasystole, and auricular fibrillation. "Auricular flutter" is defined as a "pathological action of the auricles characterised by rhythmic co-ordinate contractions of their musculature at a rate that is greatly accelerated, and is usually between 250 and 300 per minute." The term was first applied to the human auricles by Jolly and Ritchie in 1911, and was taken from papers on the physiology of the auricles, published in 1887 and 1888 by MacWilliam of Aberdeen, in which he described a condition experimentally induced identical in all its essential features with the clinical disorder now differentiated. After a summary of what is known of the etiology and morbid anatomy, the chapter is reached which deals with records of cases. They are as yet not many, and we are glad to have some of Dr. Ritchie's own cases given with fulness. Some of them have been followed with graphic records over several years, and show physiological rhythm, flutter, and fibrillation interchanging with one another at different times. The symptoms are shown to be mainly due, not to the auricles directly, but to their influence on the ventricles in producing acceleration. The ventricular rate is usually one-half of the auricular rate, that is, 125 to 150 per minute. Diastole is greatly curtailed and the ventricular pulsations weakened. Most of the cases come on in the course of chronic heart disease, and it is easy to see how a presystolic murmur may then disappear. But flutter occurs also with partial or complete heart-block, and even in apparently healthy hearts paroxysmal attacks may cause alarming symptoms. Valuable chapters are devoted to graphic records, to the action of the vagus and sympathetic, and to the action of digitalis and its allies. In the section on diagnosis useful suggestions are given for suspecting the presence of flutter, but in many cases the polygraph or galvanometer must be used to make things clear. Full consideration (with tracings) is given to the conditions for which flutter might be mistaken, viz. physiological rhythm without and with acceleration, extrasystolic arrhythmic, nodal rhythm,

and auricular fibrillation. Chapters on prognosis and treatment conclude the work.

We expect that the peculiar merits of this book will quickly meet with a wide recognition amongst the scientifically-inclined physicians of Europe and America. There is evidence of a vast amount of original observation and close thinking, the exposition is lucid, the graphic records are clear and numerous, and the work is comprehensive. So we heartily congratulate Dr. Ritchie on the successful accomplishment of his task.

Diagnosis of the Malignant Tumours of the Abdominal Viscera. By Professor RUDOLPH SCHMIDT, Innsbrück. Authorised English Version by JOSEPH BURKE, Sc.D., M.D., Buffalo, N.Y. London: William Heinemann. 1914. Price 17s. 6d. net.

THE diagnosis of abdominal growths can never fail to be a source of interest, alike to the physician and the surgeon. The difficulties attending their recognition and their relations to the viscera, largely arising from the extent and depth of the abdominal cavity, lead probably to more errors in diagnosis here than in any other region of the body, despite the aid available from recent science. Accordingly, any light that can be obtained upon the subject from any quarter must be welcomed.

The volume now before us deals exclusively with the diagnosis of malignant tumours. It is written mainly from the clinical standpoint, and no one can fail to recognise the work of a clinician of wide experience, masterly grasp, and sound judgment.

After a careful account of the physical examination of the abdomen for tumours and their manifestations, the author proceeds to the consideration of the diagnosis of malignant growths in the various viscera, beginning with cancer of the stomach, to which subject a large space is devoted. The symptoms and evidences of this condition are analysed with minuteness and accuracy, and it is hardly possible to find anything omitted which is capable of throwing light upon the existence of the disease. In difficult or doubtful cases the importance of systematic examination of the faces for evidences of hæmorrhage, however slight, is rightly emphasised. The same thoroughness of investigation characterises the chapters on malignant growths in the intestines, the liver, the pancreas, and the kidney. A large part of the work is taken up with illustrative cases drawn from the author's extensive experience, the details of no fewer than 105 cases of cancer of the stomach being recorded. A smaller number, we venture to think, might have sufficed.

The work is full of valuable information for the physician, whether engaged in hospital or private practice. The translation has been carefully done, although it must be admitted the book is not altogether an easy one to read.

Menigeuritis Meningealis. By HENRY HEIMAN, M.D., and SAMUEL FELDSTEIN, M.D. With Introduction by HENRY KOPLIK, M.D. Pp. xiv. + 305. With 39 Illustrations. Philadelphia and London: J. B. Lippincott Co. 1914. Price 12s. 6d. net.

DURING the last ten years the prevalence of cerebro-spinal meningitis in its epidemic form in Europe and America has led to a more exact and detailed knowledge of this interesting disease, and contributions to the literature of the subject have been very numerous. We welcome, therefore, this volume, which not only contains a most admirable summary of all the most important observations recently made, but also embodies the extensive experience gained by the authors in Koplik's wards. It is written in a clear and attractive style, is very practical in character, and is admirably illustrated. The chapters on diagnosis are very well done, and cannot fail to be of great assistance, even to practitioners with considerable experience of the disease. As regards treatment, the authors lay stress on a manometer being always employed when fluid is being drawn off from the spinal canal, and give detailed instructions for the administration of serum. While they themselves have used Flexner's serum, they describe the methods of preparation of those of Dopter, Kollé, and Wassermann, etc., and do not appear to think that there is much difference in the effectiveness of the different serums. Untoward results following the injections into the spinal canal are discussed, and the authors consider that vigorous artificial respiration is the most reliable treatment when the respiration begins to change its character and shock is threatened. They give the excellent advice that no patient should be left immediately after injection, but that medical assistance should be available at once in case of accidents. In performing lumbar puncture they prefer, we are glad to note, the horizontal position. We can heartily recommend this book to all interested in the subject as a most practical and trustworthy guide.

Treatment of Neurasthenia. By Dr. PAUL HARTENBERG. Translated by ERNEST PLAYFAIR, M.B., M.R.C.P. Pp. 283. London: Henry Frowde and Hodder & Stoughton. 1914. Price 6s.

THE author regards "fatiguability" as the pathognomonic symptom of neurasthenia, and considers that this represents a lowered nerve potential comparable to the lowered E.M.F. of a run-down battery. Congenital defect of nerve potential, toxins, and depressing emotions may all contribute to bring this about. Great care in expenditure of energy is therefore advised to all neurasthenics. The tissues must be built up. Drugs are prescribed, not only those with a tonic action, but also the whole class of the sedatives, with a freedom that borders on the dangerous side. The physical methods of electricity, douches, and dry heat are used extensively. The author admittedly uses

psychotherapy, but only in an indirect way. The original has been rendered into good English.

Renal Diagnosis in Medicine and Surgery. By Dr. VICTOR BLUM. English Translation by WILFRED B. CHRISTOPHERSON. Pp. 144. With 16 Illustrations. London: John Bale, Sons & Danielsson, Ltd. 1914. Price 7s. 6d. net.

THE tests that can be usefully applied for estimating renal competency are here reviewed, and then the significance of functional diagnosis in surgical and medical treatment is discussed and illustrated by typical case records. Surgeons will read with interest the section on the indications for prostatectomy, while physicians will find of use the table for the differential diagnosis of the various forms of nephritis based upon functional tests and symptomatology. Cryoscopy and ureteral catheterisation are looked upon as indispensable aids, and experimental polyuria as a valuable test. The phthalein method is held to be of more use for medical than surgical diagnosis, being too delicate for partial unilateral lesions. The book can be recommended to all who are specially interested in diseases of the kidneys.

Appendicitis: A Plea for Immediate Operation By EDMUND OWEN. Pp. viii. + 214. With 4 Illustrations. Bristol: John Wright & Sons, Ltd. 1914. Price 3s. 6d. net.

MR. EDMUND OWEN, in this readable and convincing book, states that his object has been to help in making the immediate operation the routine treatment of appendicitis. It is of interest in his remarks upon the causation of appendicitis that he emphasises the *role* played by the ever-present road dust, the result of motor traffic. The book deals with the diagnosis, treatment, and after-treatment of appendicitis, and through it all there is manifested and emphasised the undoubted claim for the immediate operative treatment, with which it may be said practically every surgeon is in agreement. All general practitioners and physicians who have not yet been convinced would do well to spend an hour or so in the perusal of this work.

The Practice of Surgery. By RUSSELL HOWARD, M.S.(Lond.), F.R.C.S. Pp. 1227. With 531 Illustrations. London: Edward Arnold. 1914. Price 21s. net.

THE author of this new text-book indicates in his preface that it is intended to furnish students with an embodiment of the surgical teaching received at the London Hospital. It has therefore a special interest and appeal, but on this account can hardly be expected to compete with others written from a more catholic standpoint. It is very comprehensive and its arrangement is good. About equal portions

are devoted to general and to special surgery; and the latter part, while full enough, is not unduly detailed for the student. The teaching as a whole in regard to methods of treatment is essentially conservative, and the student adopting it will certainly only err on the safe side. Operative treatment of fractures, however, is rather favoured. On the other hand, for instance, the results of nerve anastomosis are stated not to be very satisfactory so far. While in its purely surgical aspects this work may be said very fairly to represent modern views, the same can scarcely be claimed in regard to a good deal of the pathological and bacteriological teaching. For example, to say that it is at present undecided whether bovine tubercle bacilli are identical with the human type or incapable of causing tuberculosis in man, is to ignore the work of the Tuberculosis Commission. Again, it seems a pity that students should still be sent into practice with the impression that the pathology and clinical features of the varied forms of chronic arthritis, here grouped under the heading of osteo-arthritis, are similar.

In the matter of illustrations the book is well furnished, and their reproduction is satisfactory, only a few of the half-tone blocks being somewhat obscure. The subjects are carefully chosen, but more value might have been gained for them if they had been correlated to the text.

The British Journal of Surgery. Edited by E. W. HEE GROVES. Vol. I.
Pp. vii. + 748. With 484 Illustrations. Bristol: John Wright & Sons, Ltd. 1914. Price 30s. net.

ON the appearance of the first number of this new venture we anticipated for it a successful career, and the issue of the first complete volume confirms us in the belief that British surgery has at last found a worthy representation in current periodical literature. The original papers range over all departments of modern surgery and are of the highest scientific value. Short biographical notes on the old masters in surgery, with excellent portraits, are interspersed; and a series of articles descriptive of the more important modern clinics in various parts of the world keep the reader in touch with all that is progressive in surgery. Each number contains a sort of "confessional," devoted to "Instructive Mistakes," which offer as much valuable instruction to the reader as they must have done to the (anonymous) patients who record them. The illustrations are exceptionally good.

Ophthalmoscopic Diagnosis. By Dr. C. ADAM, Berlin. Translated by Dr. M. L. FOSTER. Pp. xx. + 225. With 104 Illustrations. London: Heinemann (Rebman, Ltd.). 1913. Price 25s. net.

THE distinguished German ophthalmic surgeon has produced a very useful book, which he will not allow to be described as an atlas, but it should not be recognised that its true function is to be a guide to

diagnosis, and not merely a series of illustrations of various physiological and pathological aspects of the fundus. He is quite right to adopt this attitude, though his contention in the preface that the first to use the ophthalmoscopic sign (incorrectly called "symptom") was Elsching is open to question, and the book under discussion is wisely built on these lines. It begins with a discussion of methods, the directions for which are somewhat laborious: they might quite well have been briefer with equal accuracy—with some of them indeed we do not agree. For example, the illustration on page 8, intended as a model, shows an observer committing at least three faults, in our opinion. The surgeon who issues a book intended to illustrate the fundus lays himself open to criticism of all kinds, and there are several of the diagrams which do not appear to us to be very conclusive or indeed quite accurate: and there is none which really illustrates the common form of disseminated choroiditis—a disease so important to the clinician that one which bears this label is too extreme to be a good guide for a beginner. On general grounds would it not be better to discard the term papilla altogether, since we know that no papilla, properly so called, exists and call it a disc? Certain of the figures are not too good, but it must be admitted that the great majority are excellent, and if we pick a hole here and there, it is yet true that the book is in general terms an excellent one, and well calculated to *teach* the student of the subject, and incidentally to enhance still further the high reputation of its author. Two improvements may, without harm, be suggested as possible—first, that there are too many irritating divisions and subdivisions in the text, and that both the black and white illustrations in the letterpress and the coloured full-page representations of the fundus are called "Figures"; as these are not consecutive, one is troubled by having to search for the proper page in following up a reference. They should be called Figure in the one case and Plate in the other.

Guide to the Microscopic Examination of the Eye. By Professor R. GREEFF. Translated from the Third German Edition by HUGH WALKER, M.A., M.B., C.M., Ophthalmic Surgeon to the Victoria Infirmary, Glasgow. Pp. 86. London: The Ophthalmoscope Press. Price 7s. 6d. net.

THIS standard work by Professor Greeff has been of great use to the laboratory worker in this particular line. The book gives in small compass the most convenient and most approved methods of preparing the ocular tissues for microscopic examination. The instructions are singularly clear and practical, and the methods described are always those with which the author is really familiar. The work of translation has been very ably carried out by Mr. Walker.

FOREIGN BOOKS.

Handbuch der Tuberculose. Bd. I. In Five Volumes. By Various Writers. Edited by Drs. BRAUER, SCHROEDER, and LICHTENSTEIN. Pp. 792. With 125 Illustrations. Leipzig: Johann Ambrosius Barth. 1914. Price Mk. 35.

THE book forms a very comprehensive treatise on tuberculosis. When complete it should be a library in itself. This first volume is divided into two parts, and each section written by a different writer. The first part begins with a very complete historical survey from the earliest times up to these days of complement-fixation tests. Then follow various sections on pathological anatomy, the micro-organism, pathways of infection, immunity, epidemiology, etc. The second part is concerned with pulmonary tuberculosis, diagnosis, clinical forms, etc. In the section of pathological anatomy it is interesting to note that in a study of eight cases of tuberculosis of the suprarenals, it was always secondary to pulmonary tuberculosis.

The chemistry of the bacillus is fully entered into and detailed descriptions are given of the differences between the human, bovine, and avian types of bacilli. In dealing with the infectivity of the disease the author lays stress on segregation and notification, as he points out that the tubercle bacillus does not exist free in nature, and that the source of infection is always a tuberculous man or animal. It is just possible that after all segregation will be the greatest factor in eliminating the disease from our midst. In the section dealing with tuberculin Pirquet's cutaneous reaction is urged. A positive reaction is taken to mean the presence of tuberculosis, and a prognostic value is attached to the character of the reaction. The stronger the reaction, the better the prognosis.

In the chapter on X-rays, which has several excellent plates, the writer dwells on the importance of this as an aid to diagnosis. A very interesting article is written by Jacobaeus of Stockholm on what he calls "Thorakoscopy und Laparascopy." His method is, apparently, to use a large trocar to penetrate the thoracic or abdominal wall, and then use a cystoscope to examine the interior. The method is only of use in cases with ascites or in pleural effusion or pneumothorax, and although the author claims many advantages for it, it is doubtful if the procedure will become general. The last few pages are taken up with the clinical form of tuberculosis.

The book is well written, the contents full, and the illustrations very good. It should appeal to the general practitioner as well as to the specialist. It can be thoroughly recommended.

Behandlung kosmetischer Hautleiden (Schönheitsfehler). Von Sanitätsrat Dr. S. JESSNER. Dritte Auflage. Mit 11 Abbildungen. Würzburg: Curt Kabitzsch. 1914. Price Mk. 2.50.

THE successful removal of blemishes appeals to a wide circle, and in the volume under notice Jessner has shown how this can be accomplished by the most modern means at our disposal and in the most satisfactory manner. The fact that this third edition exceeds by more than thirty pages its predecessor, published in 1908, is proof of the advances which have been made in this direction within recent years. Thus carbonic-acid snow is fully dealt with, and its advantages and drawbacks discussed. Again, the value of the uviole light, the quartz lamp, and heliotherapy receive attention. A topic which exercises the minds of those who have busied themselves with cosmetic procedures is massage. To the indications for its use and mode of employment a dozen pages are devoted, and full details for its practice are laid down. The hair and nails come in for due regard, and from the contents many hints for the preservation and increase of attractiveness may be culled.

Les Teintures Capillaires a la P. Phénylène Diamine—de leur interdiction aux idiosyncrasiques. Par E. ROUSSEAU, M.D., Paris. Pp. 96. Paris: Amédée Legrand. 1914. Price 3 francs.

FOR dyeing the hair two procedures are available: one, in which the desired tint is attained slowly and with the expenditure of considerable trouble; the other, where the process is nearly instantaneous and results in a brilliant and natural shade. The staining agents belonging to the latter type are, however, distinctly poisonous to a few individuals who possess an idiosyncrasy to such tinctorial substances. Still, the rage for displaying an attractive chevelure is so predominating that ladies are willing to risk almost anything to obtain it. The author has most thoroughly studied the subject, and in the volume before us furnishes rules which, if followed, will obviate the dangers alluded to. Though primarily intended for the hairdresser, the topic is assuredly not beneath the notice of medical practitioners. We cordially recommend its perusal.

Formulaire de Thérapie Clinique. By Dr. L. PRON and Dr. A. CANTONNET. Second Edition. Pp. 544. Paris: Maloine. 1914. Price 6 francs.

DOCTORS practising amongst patients who like to be treated by "the latest methods" and with the most recent medicaments will find this book useful, if scrappy. Interested in Harrogate or Strathpeffer, they may be disappointed to find, amongst "*principales eaux étrangères*," that British watering-places are represented only by Bath, Cheltenham, and Epsom.

NEW EDITIONS.

Therapeutics of the Circulation. By SIR LAUDER BRUNTON, M.D., LL.D.
Second Edition. Pp. 535. London: John Murray. 1914.
Price 5s.

SINCE the appearance, six years ago, of the first edition of this interesting work, many important advances have been made in our knowledge of the physiology and pathology of the circulatory system. Those recent discoveries are of great practical value, forming, as they do, a basis for scientific therapeutics. Anyone who wishes to have a clear conception of the subject as it stands at present cannot do better than study the present volume, where he will find the matter set forth in that entertaining style which characterises all the author's writings. The first six chapters, devoted to physiological questions, are succeeded by an account of the modern views on the pathology of the circulation and a description of the various instrumental aids to diagnosis. The remaining ten chapters deal directly with treatment, and abound with those practical hints which are oftentimes so valuable. We heartily commend the book to the notice of our readers as a work well worthy of its distinguished author and a valuable contribution to a subject which is of such vast importance in daily practice.

Medical Gynecology. By SAMUEL WYLLIS BANTLER, M.D. Third Edition. Pp. 790. Philadelphia and London: W. B. Saunders Co. 1914. Price 21s. net.

THIS evidently popular volume has been enlarged by the addition of a very full account of the recent work on the ductless glands, and the present position, so far as it is known, of the internal secretions in general, and more particularly in gynecological therapy. This chapter is of great value, for there is probably no special department of medicine in which a knowledge of the inter-relations of the internal secretions is more necessary and helpful. At the same time it must be confessed that the chapter is so long and so loaded with detail that the broad principles are somewhat regrettably obscured. Where he confines his attention to actual methods of treatment the author's suggestions are invariably good, and as a work of reference for the practitioner the book can be cordially recommended.

Diagnosis. By HOBART AMORY HARE, M.D., B.Sc. Seventh Edition. Pp. xii. + 547. With 175 Illustrations. London: Henry Kimpton. 1914. Price 18s. net.

THE author deals with disease from the practical bedside point of view. Taking symptoms and signs, he suggests the various diseases of which they are indications, he explains them, and gives points of differentiation, and by grouping them together builds up a diagnosis.

His chapter on the heart and vessels is scarcely up to the standard of the rest of the book. He gives little or nothing of the more recent advances in the recognition of heart-block and auricular fibrillation, nor are his explanations of these and allied conditions satisfactory. In other chapters there are several statements with which the reviewer does not agree—for example, the author states that rheumatic nodules are “usually permanent.” On the whole the book is good, and should be a useful aid to the physician in the diagnosis of difficult cases.

Anæsthetics: Their Uses and Administration. By DUDLEY BUXTON, M.D.,
Fifth Edition. Pp. xiv. + 477. London: H. K. Lewis. Price
10s. 6d. net.

At a time when many new methods of administering anæsthetics are being weighed in the balance the considered opinions of so able and experienced an anæsthetist as Dr. Buxton cannot but be welcome. To this enlarged edition of his well-known work the author has brought to bear not only his ripe knowledge, but, what is equally important, an open mind. The book is well illustrated and thoroughly up to date, and can with confidence be recommended to anyone who desires to possess a clear exposition of the science and art of anæsthesia as it presents itself to-day.

The Nature of Enzyme Action. By W. M. BAYLISS, D.Sc., F.R.S.
Third Edition. Pp. viii. + 180. London: Longmans, Green
& Co. 1914. Price 5s. net.

It is difficult in a short monograph to deal clearly and effectively with so complex a theme as the action of enzymes, but Professor Bayliss has succeeded in doing so. The little volume deserves thorough study by all practitioners of medicine, and is calculated to aid them greatly in the solution of many of the problems which daily confront them. It explains, so far as our present knowledge permits us to understand the process, how the living organism can effect a number of chemical reactions which elsewhere demand high temperatures and powerful reagents.

The Sanitary Inspector's Handbook. By ALBERT TAYLOR. Fifth Edition.
Pp. 612. London: H. K. Lewis. 1913. Price 6s. net.

THIS is now rightly looked upon as a standard text-book by officials and students alike. Mr. Taylor knows exactly what points require emphasis and writes in a straightforward manner. The work is fully illustrated and has been brought well up to date. Not its least valuable feature is the liberal quotations of legal decisions on outstanding matters of public health procedure. The book is well produced.

Ionic Medication. By H. LEWIS JONES, M.D. Second Edition. Pp. 155. London: H. K. Lewis. 1914. Price 5s. net.

THAT the first edition of this work has been exhausted within six months is a striking proof of the useful purpose it is serving. The only alterations which have been made are some rearrangement of the paragraphs in the first chapter, and some additional matter regarding pericarditis, teno-synovitis, and on the elimination of lead by electrolysis according to Sir Thomas Oliver's method. One could wish for rather more information regarding the latter's results, owing to the practical importance of the subject.

NOTES ON BOOKS.

WE congratulate Mr. Herbert J. Paterson on the early call for a second edition of his *Surgery of the Stomach* (Jas. Nisbet & Co., Ltd., price 15s. net). Stereoscopic illustrations of the operation of gastro-enterostomy have replaced those used in the first issue. For a work of this scope the literary references are still quite inadequate.

Lectures on Dietetics, by Max Einhorn, M.D. (H. K. Lewis, 1914, price 4s. net). In this little book the subject is treated in a clear and practical way. Some useful tables, giving the composition and caloric value of the commoner food-stuffs, are included, and also several important standard diet régimes. General practitioners will find that the author has provided them with many suggestions of real value.

Preliminary Report on the *Treatment of Pulmonary Tuberculosis with Tuberculin*, by Noel D. Bardswell, M.D. (H. K. Lewis, 1914, price 6s. net). Obviously Dr. Bardswell starts with somewhat of a bias against the use of tuberculin, and his conclusions share in this bias. Though the numbers dealt with are relatively small, he has been unfortunate, in that during the treatment of 154 cases at Midhurst he has not come across some in which the administration of tuberculin has definitely turned the scales in favour of the patient. It appears unnecessary to quote as an original finding—a fact which is axiomatic with all responsible administrators of tuberculin—"that the administration of tuberculin is quite unsuitable as a routine method of treatment for all cases of pulmonary tuberculin."

Manual of X-Ray Technique, by Arthur C. Christie (J. E. Lippincott Co., 1914, price 6s. net). This short manual may well be recommended to those surgeons who, not having had previous experience of X-ray work, find themselves suddenly in charge of an X-ray department. The author has succeeded in condensing much useful information within the 100 pages, but the purpose of the book would have been perhaps better served if he had directed more attention to the actual working of the apparatus and less to diagnosis.

Skin and Venereal Diseases, by Baum and Moyer, Practical Medicine Series, 1913, Vol. IX. (the Year-Book Publishers, price \$1.35). This volume keeps up the high standard of the series. Particularly good are the articles on gonorrhoea and syphilis. For the general practitioner it supplies a ready means of keeping up to date.

The *Medical Annual* (John Wright & Sons, Ltd., price 8s. 6d. net) has long been accepted as a most reliable summary of the year's work in practical and scientific medicine, and the 32nd issue now before us maintains the high standard of its predecessors. This work is indispensable to the busy practitioner who is desirous to have at hand a ready reference to recent advances in all departments of medicine.

The *Students' Pocket Prescriber*, by H. Aubrey Husband (E. & S. Livingstone, price 1s. 6d.), which is now in its fourth edition, contains an excellent series of prescriptions and much useful information regarding prescription writing.

Index-Catalogue of the Library of the Surgeon-General's Office, United States Army (2nd series, Vol. XVIII., Tetamore-Tzschirner). The compilation of this monumental bibliography is now drawing to a close. The volume before us, which runs to 1057 pages, includes the bibliography of tuberculosis, which takes up no less than 418 pages, yet the entries are so skilfully classified that it is comparatively easy to find the references to any given point in this vast subject.

BOOKS RECEIVED.

BRILL, A. A. <i>Psychoanalysis</i> . Second Edition	(W. B. Saunders Co.)	13s.
CHAPLIN, A. Thomas Shortt, Principal Medical Officer in St. Helena	(Stanley Paul & Co.)	2s.
COLLECTED PAPERS by the Staff of St. Mary's Hospital Mayo Clinic, 1913	(W. B. Saunders Co.)	24s.
FREYBERGER, L. <i>The Pocket Formulary for the Treatment of Disease in Children</i> . Fourth Edition	(Wm. Heinemann)	7s. 6d.
GLAISTER, J., and D. D. LOGAN. <i>Gas Poisoning in Mining and other Industries</i>	(E. & S. Livingstone)	10s. 6d.
GLOVER, W. <i>Know Your Own Mind</i>	(Cambridge University Press)	2s.
GRULEE, C. G. <i>Infant Feeding</i> . Second Edition	(W. B. Saunders Co.)	13s.
LAMBART, H. C. <i>A Practical Handbook of the Tropical Diseases of Asia and Africa</i>	(C. Griffin & Co., Ltd.)	8s. 6d.
MANSON, Sir P. <i>Tropical Diseases</i> . Fifth Edition	(Cassell & Co., Ltd.)	12s. 6d.
MURRELL, W., and W. G. A. ROBERTSON. <i>Aids to Forensic Medicine and Toxicology</i> . Eighth Edition	(Baillière, Tindall & Cox)	2s.
OSTON, M. <i>Queer Patients</i> . Second Edition	(Murray & Evenden, Ltd.)	2s.
RANK, O. <i>The Myth of the Birth of the Hero</i> (<i>Nervous and Mental Disease Publishing Co.</i>)		1 dol.
RUTHERFORD, A. H. <i>The Ileo-Cæcal Valve</i>	(H. K. Lewis)	6s.
ST. THOMAS' Hospital Reports. New Series, 1914. Vol. XLI.	(J. & A. Churchill)	8s. 6d.
STOPFORD-TATLOR, G., and R. W. MACKENNA. <i>The Salvarsan Treatment of Syphilis</i>	(Wm. Heinemann)	5s.
THE CLINICS of JOHN B. MURPHY, M.D. Vol. III. No. 2	(W. B. Saunders Co.)	—
TRANSACTIONS of the College of Physicians of Philadelphia, 1913. Vol. XXXV.		—
WEBSTER, Mrs. J. J., and Mrs. H. LLEWELYN. <i>The Apsley Cookery Book for the Uric-Acid-Free Diet</i>	(J. & A. Churchill)	8s. 6d.
YOUNGER, E. G. <i>Insanity in Everyday Practice</i> . Third Edition (Baillière, Tindall & Cox)		3s. 6d.
ZEITSCHRIFT für Sexualwissenschaft. Band I., Heft 1. April 1914	(Morris & Weiner's Verlag)	—

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

The Aberdeen Chair of Pathology.

THE King has been pleased, on the recommendation of the Scottish Secretary, to approve of the appointment of Dr. Shennan to the vacant Chair of Pathology in Aberdeen. We but voice the feeling of all his colleagues and friends in saying that Dr. Shennan's work in Edinburgh has thoroughly deserved this recognition: we sincerely congratulate him, and wish him well in his new sphere.

Congenital Anomalies in Africans.

ALTHOUGH the opinion has been expressed (on slender enough grounds) that enhanced liability to congenital defects among civilised races is Nature's revenge for over-civilisation, very little is accurately known as to the prevalence of congenital anomalies in uncivilised, or partially civilised, peoples. For instance, it is not, we believe, definitely known whether Mongolism occurs among the Mongolian races. In a recent text-book the statement is made that the defect is limited to the Caucasian, but, as we shall see, it has been met with among the Bantus. That we should be ignorant of savage teratology is not surprising; the reasons for its neglect are obvious. Tropical medicine has had its hands full of more urgent problems, and apart from such deformities as are remediable by surgery, the subject is of more scientific than practical importance. Again, as difficulties in estimating the prevalence of defects, it must be remembered that in an unclad race these will be more conspicuous, and may therefore appear relatively more common; on the other hand, it is notorious that in the lower stages of culture deformed infants are, from superstitious motives, done away with, even although the defect—hare-lip, for instance—does not render them unfit to hold their own in life. Further, survivors who are handicapped by any serious defect may well succumb early in the struggle for existence. These remarks are prompted by an interesting study by Dr. Stannus * of the malformations among the Bantus of Nyasaland. He met with a great number of the abnormalities with which we are familiar in this country, and without its being possible to draw any quite definite conclusion, the impression his paper gives is that some of the rarer anomalies must be at least

* *Biometrika*, April 1914.

as frequent as at home, while others seem to be peculiarly common among the tribes in question. Various forms of dwarfing were seen, including idiopathic infantilism, ateleiosis, and achondroplasia. The last of these, we know, was recognised by the ancient Egyptians. Cretins were not met with; it may be conjectured that bad cretins are not improbably destroyed or die, otherwise it is curious that this disease, which is so common here as compared with achondroplasia and ateleiosis, should apparently not exist among these negroes. Neither acromegaly nor gigantism came under Dr. Stannus' notice. Among forms of idiocy, spastic diplegia, microcephaly, and Mongolism were seen. In view of the statement of the author quoted above, who writes from America with its large negro population, the recognition of Mongolism among the Bantus is of some interest. General obesity was not seen, and steatopygia, a racial characteristic of Hottentots and Bushmen, is not a feature of these tribes. Another defect, which is very rare in Europe, and of which two instances were seen, is oxycephaly. Leaving aside a number of minor or well-known deformities of the eyes, jaws, and mouth, which neither in form nor frequency differ markedly from those met with in Europe, we come to some anomalies which seem to be especially prevalent among the natives. Helical fistula—a pit on the helix of the ear indicative of imperfect closure of the first branchial cleft—was met with in 4·5 per cent. of nearly 6500 consecutive persons examined. It is so common as to have no name and to pass unregarded, whereas in this country it is decidedly rare. Accessory nipples and breasts—said to be not very infrequent among the Japanese also—were found sufficiently often to suggest that they are a relatively common anomaly in Nyasaland. Of malformations of the limbs, polydactyly, lobster hand, and congenital humeral micromelia were the most striking. Much more common and characteristic, however, is a peculiar retraction of the fourth (or sometimes another) toe, due to an abnormally short metatarsal. A similar abnormality has been noted as frequent in Egypt.

Dr. Stannus points out that the slighter a deformity, the greater its frequency, and that marked deformities are only seen in children in places where European influence is felt. This, of course, is due to the practice of destroying deformed infants, and it results that hare-lip, cleft palate, and similar common (European) defects are rarely seen among Africans. The same, for instance, is the experience in Egypt, where in eleven years only one case of cleft palate was operated on in the Kasr-el Ainy Hospital, to which 2000 to 3000 surgical patients are admitted annually. Among thousands of ancient Egyptian bodies examined by Elliot Smith there was only one case of cleft palate and one of talipes. Dr. Stannus' observations and those of Captain Hughes, R.A.M.C., however, show that minor anomalies, which escape attention from their insignificance, are common—probably more common than in

Europe—and we may conclude with them that but for the practice of exposing infants more serious defects would be common also. In any case, higher culture cannot be blamed for any part in the greater prevalence of malformations, except in so far as it spares and protects the malformed.

Royal Colleges Golf Club.

THE Annual Meeting of this Club was held at New Luffness, on Thursday, 25th June.

Thirty-five members were present, and a most enjoyable day was spent, in spite of the high wind which made good scoring very difficult. The Argyll Robertson Medal (scratch) was won by George L. Chiene with a score of 87, and the President of the Royal College of Surgeons' prize by Charles H. Thatcher with 93 - 8 = 85. In the afternoon the match for the Inter-College Trophy was played, the College of Surgeons winning by three matches.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—

At the Quarterly Examinations of the above Board, held in Edinburgh in July, the following candidates passed the *First Examination*: A. I. Meek; Leslie Macduff; James Chambers; P. C. H. Homor; W. V. Jackson; H. G. Smith; D. C. Thioms; S. D. Vania; and E. L. Adondorff. The following passed the *Second Examination*:—J. C. Bodwell; W. A. Mein; F. C. J. Mitchell; J. H. Brown; D. M'G. Stewart; James Byrne; and Martha H. Hoahing. The following candidates passed the *Third Examination*:—E. A. Hollson; E. C. Haller; T. D. Renwick; James Bannerman; W. J. F. Craig; Archibald Evans; J. V. R. Rohan; A. W. M'Gregor; J. E. Ainsley; W. H. A. D. Sutton; R. V. Clarke; J. P. Fairley; Laurence Fraser; J. H. Blackburn; and Alfred Parker. The following, having passed the *Final Examination*, were admitted L.R.C.P.E., L.R.C.S.E., L.R.F.P. & S.G.:—J. K. Venables, New Zealand; K. G. Fraser, Scotland; T. E. Lawson, Coventry; D. C. Graham, Darjeeling, India; R. M'G. Paterson, Punjab; R. E. Hingworth, Edinburgh; J. M. Chrystie, Dumfries; E. C. Brooks, Karachi, India; N. R. Whitaker, Edinburgh; Wm. Millerick, Co. Cork; J. M. Boyers, South Africa; Walter Chapman, British Guiana; T. B. Truter, Cape Colony; and J. V. Duffy, Hebburn.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—

At a meeting of the College held on 21st July the following gentlemen, having passed the requisite examinations, were admitted Fellows of the College:—Robert B. Blair, Markinch, Fife; Joseph J. Brown, Darlington; Arthur B. Cardew, Cheltenham; Harry A. Gibson, Alberta, Canada; Iwarka P. Goll, Captain, Indian Medical Service; William W. Greer, Edinburgh; Allan G. Hamilton, Liverpool; Leonard Hirsch, Captain, Indian Medical Service; John Roneyford, Edinburgh; Ernest H. Howard, Tannarunui, New Zealand; Gerald L. Little, Captain, Indian Medical Service; James McCollan, Limermont, Cumberland; John D. MacEwen, Edinburgh; Ernest Mair, Edinburgh; James B. Wilkie, Platten, Kirriemuir.

OBSERVATIONS ON THE PATHOLOGY AND ETIOLOGY
OF DUODENAL ULCER.*

By D. P. D. WILKIE, Ch.M., F.R.C.S.,
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TEN years ago duodenal ulcer was regarded as a rare and obscure if somewhat dangerous malady, now we know it to be one which not only is of frequent occurrence, but can usually be diagnosed and successfully treated. The credit for this new knowledge belongs to surgery, and the names of W. J. Mayo, Moynihan, and Mayo Robson must always be associated with this advance.

The importance of studying the pathology of the living, which Moynihan has done so much to emphasise and illustrate, can hardly be overestimated. At the same time it must be allowed that this study has its limitations as well as its great advantages, and that it may, even in the case of duodenal ulcer, be usefully supplemented by post-mortem room observations.

I have therefore little diffidence in bringing before you certain facts which, though supplemented by evidence from other sources, were gained mainly from the post-mortem room. During the past three years I have, through the courtesy of the pathologists of the Edinburgh Royal Infirmary, had the opportunity of examining for duodenal ulcer and factors bearing thereon at some 490 post mortems.† In this number I have met with 41 cases of duodenal ulcer. In only six cases had the duodenal condition any direct connection with the death of the patient—three deaths occurring after operation for perforated duodenal ulcer, one from a perforation not operated on, and two after gastro-enterostomy for a chronic duodenal ulcer. In only six cases had a diagnosis of duodenal ulcer been made before death, and all of these had been subjected to operation. At first sight this fact would seem to lend colour to the view that the diagnosis of duodenal ulcer is by no means so easy as many would have us believe. Whilst it is true that in several of these cases a large chronic ulcer with a marked stenosis of the duodenum was found, without there being any reference to digestive disturbance in a carefully taken case-record from the wards, it must be borne in mind that most of the patients had been under treatment for some other severe and eventually fatal malady, the symptoms of which overshadowed and obscured those of the duodenal lesion. At the same time, in

* Read before the Edinburgh Medico-Chirurgical Society, April 1914.

† It should be stated that these represented barely one-half of the total post mortems during that period.

one or two cases where a chronic ulcer was found in the duodenum it could be confidently stated that it had caused during life none of the typical symptoms which we associate with the condition. There would appear to be a variety of ulcer, which might be termed "silent" duodenal ulcer, that may attain considerable size, and may even cause death by hæmorrhage or perforation, without producing any noteworthy symptoms. It was remarkable that the subjects of this "silent" type of duodenal ulcer were generally old people with arteriosclerosis, and in most, though not all, of them the ulcer was situated on the posterior wall of the duodenum. In the Edinburgh statistics¹ on perforated duodenal ulcer there were among the 200 cases recorded 17 in which no history of digestive trouble previous to the sudden perforation could be elicited. Gruber, from very extensive post-mortem room observations, also found that 75 per cent. of the duodenal ulcers found after death had not been diagnosed during life. After making allowance for the special difficulties in obtaining a complete and accurate history in many of these cases, it was still clear from both these statistical studies that a chronic duodenal ulcer might exist without giving rise to the clinical picture which we regard as typical of this malady. Gruber² in his analysis also noted the frequency of symptomless duodenal ulcer in old people with arteriosclerosis. It must, I think, be allowed that the last word on the diagnosis of duodenal ulcer has not been spoken. The *syndrome pylorique*, so clearly described by Soupault,³ resembling as it does very closely the symptom-complex of duodenal ulcer as defined by Moynihan, may be and usually is associated with the presence of a duodenal ulcer, but not always is this the case. This *syndrome pylorique* would appear to be the clinical expression of an irritable condition of the pyloric musculature favouring spasmodic contraction, a condition to my mind associated no less with the etiology than with the symptomatology of duodenal ulcer. The *syndrome pylorique* may, however, be associated with ulcer on the gastric side of the pylorus, and there must be few surgeons who have not had the experience of opening the abdomen of a patient whose symptoms were those which are usually regarded as typical of duodenal ulcer, and of finding an ulcer in the lesser curvature of the stomach.

MORBID ANATOMY.

Site of Ulcers.—In all the 41 cases the lesion was situated in the first part of the duodenum, and with two exceptions within

one inch of the pylorus. In regard to the exact situation of the ulcers in the first part of the duodenum, it was found that in 9 cases the ulcer was on the anterior wall, from half to three-quarters of an inch beyond the pylorus; in 12 cases it was on the posterior; and in other 12 there was an ulcer on both anterior and posterior walls directly opposite—the “kissing ulcers” as described by Moynihan (Fig. 1). In 5 cases the ulcer was at the upper part or roof of the duodenum just beyond the pylorus, whilst in one case, a female subject, a large ulcer occupied the lower wall of the duodenum, extended on to the posterior wall and invaded the pylorus.

In 21 cases there was but one ulcer, in 16 two ulcers, and in 4 more than two ulcers.

These figures differ from those taken from operation records, in the relatively large number of ulcers on the posterior wall which they embrace, in the large proportion of cases with multiple ulcers, and most notably in the relative frequency of the “kissing” type of ulcer which they illustrate.

In some of the cases where an ulcer of fair size was found on the posterior wall, when the duodenum was opened no suspicion of its presence had been aroused by a careful examination of the unopened gut. The impression left by such cases is that this type of ulcer must be frequently overlooked at operation, and the question arises whether in doubtful cases the duodenum should not be opened and the mucous aspect of the posterior wall inspected.

In 5 cases of this series, besides the duodenal lesion, one or more gastric ulcers situated on the lesser curvature some distance from the pylorus were found.

Acute and Chronic Ulcer.—In regard to distinguishing acute from chronic duodenal ulcer, it is not so easy to speak with assurance as it is in the case of gastric ulcer. This is particularly true of ulcers situated on the anterior wall of the duodenum, as in many cases ulcers, which from the outside show evidences of chronicity, when viewed from the mucous aspect closely resemble acute ulcers. Chronic ulcers on the posterior and postero-superior walls of the duodenum are usually more easily recognised, resembling, as they often do, the large crater-like ulcers found in the stomach. Thus although it was perfectly easy to say in some cases that the ulcer was of long standing, and in others that it was definitely acute, one hesitated in a certain number to venture an opinion as to the duration of the lesion. Mayo,⁴ from an



FIG. 1.—Opposite end of specimen to Fig. 2, with old appendicular disease.

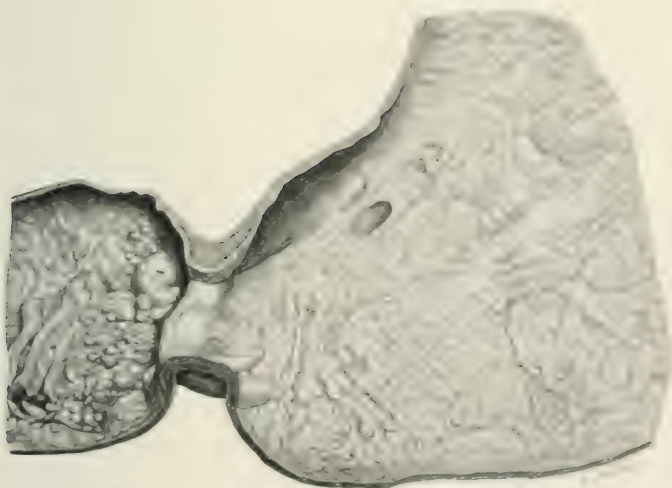


FIG. 2.—Acute duodenal ulcer along with one chronic and several acute gastric ulcers. Note the greatly enlarged lymph follicles in the first part of the duodenum. The patient had had several previous attacks of appendicitis, and died of peritonitis five days after operation for final acute attack.

examination of ulcers excised from the anterior wall of the duodenum during life, was surprised to find how small and shallow were ulcers which from the outside gave all the appearance of chronicity. The following table indicates roughly the condition found among the 66 ulcers present in these 41 cases:—

TABLE I.

Acute.	Chronic.	Doubtful Age.	Healing or Healed.
16	26	11	15

Those in column 4 of Table I. might perhaps with justice be classed among the acute variety, which is undoubtedly of frequent occurrence. The tendency of this variety to perforate has been duly emphasised by Grey Turner.⁵

ETIOLOGY OF DUODENAL ULCER.

The essential factor for the formation of a duodenal as of a gastric ulcer is that a portion of the mucosa be so devitalised that it may be digested and leave a breach of surface. For this initial devitalisation various causes have been assigned, *e.g.*—(1) the lodging of an embolus in an arteriole in the duodenal wall; (2) venous embolism, the embolus arising in the portal venous system and being carried in retrograde fashion up a duodenal vein; (3) toxic devitalisation of the mucosa the result of some toxin circulating in the blood causing a degeneration, not only of the lining epithelium of the bowel, but of the endothelium of the capillary blood-vessels, so that small hæmorrhages take place and determine local areas of lowered resistance; (4) reflex nervous spasm of the vessels or of the muscularis mucosæ causing small hæmorrhages into the mucous membrane. I have sought carefully for evidence in support of these theories in 36 of the 41 cases which I examined.

Whilst arterial embolism may occasionally be the cause of an acute duodenal ulcer, there is no evidence that it is the usual mode of origin of such ulceration. In one case of my series where from endocarditis multiple emboli had been scattered throughout the arterial system, an acute ulcer in the first part of the duodenum, surrounded by a zone of venous engorgement, was apparently of embolic origin.

Von Eiselsberg first suggested that an embolus from a thrombosed omental vein might be carried in retrograde fashion up a gastric or duodenal vein and, lodging in the venous plexus of the mucosa or submucosa, cause localised infarction of the mucous membrane and thus an ulcer. Such a sequence of events has been

shown experimentally to be possible,⁶ and is a probable cause of some cases of sudden hamatemesis occurring after an abdominal operation in which portions of omentum have been ligated. There is little or no evidence, however, to show that it is a usual cause of either gastric or duodenal ulcer. In spite of careful search I could find no facts in support of this theory in any of the cases in this series.

It is probable that a toxic degeneration or necrosis of the mucosa or of the lymph follicles of the duodenum, followed by an active digestion of the devitalised tissue, is the most frequent cause of acute ulceration. The source and nature of the toxin may vary widely; thus the products of tissue autolysis circulating in the blood cause degeneration in the parenchyma of various organs, among others the stomach and duodenum, and in the latter viscera the presence of digestive juices tends to digestion of the degenerated tissue and thus to ulceration. It is not surprising, therefore, that in patients dying some days after extensive burns gastric and duodenal ulcers should sometimes be found. In 2 of the 41 cases here dealt with, death resulted from widespread superficial burns—in the one case five, and in the other twelve, days after the accident (Fig. 2). In each an acute duodenal ulcer of about 8 mm. diameter was found, and in the stomach great congestion, with superficial erosions of the mucosa. In the majority of cases, however, there was evidence of a primary cause within the abdomen, usually in the ileum, colon, or appendix.

In two instances where death resulted from acute intestinal obstruction (small intestine) an acute ulcer was found in the first part of the duodenum.

In four cases, all of chronic duodenal ulcer, there was definite evidence of stasis in the small intestine, *i.e.*, the ileum was dilated and hypertrophied above an area involved in adhesions. In three of these cases, from the distribution of the adhesions which crippled the small intestine, it was obvious that the primary inflammatory focus had been in the appendix.

In four cases, three of chronic and one of acute ulcer, the patients had died from peritonitis resulting from acute appendicitis. In each instance there was a history of attacks of appendicular trouble previous to the final and fatal attack. In a fifth case, that of a woman who had died of mitral disease and bronchitis, an acutely inflamed appendix with localised peritonitis was found, and in the duodenum there were two large acute ulcers on the posterior wall. In a sixth case, where the patient died after

operation for perforated duodenal ulcer, the distal end of the appendix was tense and club-shaped and contained pus.

In fifteen cases the most striking abnormality within the abdomen was the condition of the colon, and although a large number of different morbid conditions were represented in this group of cases, the one factor common to them all was faecal accumulation. In 11 cases there was an actual anatomical impediment at some part of the colon, in the remaining 4 there was merely great dilatation of the proximal part of the colon. In 3 of the latter the caecum was prolapsed, dilated, and filled with scybalous faecal masses; in the fourth case, that of a woman whose bowels had acted only once a fortnight, the caecum occupied the whole of the lower part of the abdomen, being filled with a great quantity of putty-like faecal matter, whilst the distal part of the colon was studded with diverticula of varied size, most of them containing hard faecal concretions.

Analysing the 11 cases in which a mechanical obstacle to the faecal passage was present, we find that in 6 cases the obstruction was in the proximal part of the colon, and in 5 in the distal part. In all the former the impediment consisted of cicatrised pericolic bands constricting the ascending colon and having led to marked dilatation of the caecum below. In one of them there was in addition a localised pericolic abscess, and a leak from this had led to fatal peritonitis. The pericolic bands here referred to were not merely the congenital parieto-colic folds so frequently met with where no evidence of stasis is present, but they were fibrous bands definitely constricting the gut. Whether they were the cause or the result of stasis is a matter on which opinions may differ. In the second group, where the obstruction was in the distal part of the colon, a variety of conditions was included. In one case there was an annular cancerous stricture of the pelvic colon of a very fibrous scirrhus type, surrounded by numerous dense adhesions, and with great dilatation and hypertrophy of the colon above. In two cases a very pronounced degree of Payr's disease, or fusion of the distal half of the transverse colon to the descending colon, was present, and had led to great retention in the colon above. In one case the colon had not rotated and was lying on the left side of the abdomen, the small intestine occupying the right side. In this case the distal half of the colon was so matted in dense adhesions that the various parts of it could only with difficulty be identified. The caecum was enormously dilated, and hid from view all the small intestine. In the fifth case the impediment

resulted from a glueing of an unusually long pelvic colon to the mesentery of the ileum by dense fibrous adhesions. The fixation of the pelvic loop had evidently interfered with the passage of content through the colon, to judge from the accumulation of hardened faeces in the gut above. In two cases there was also pronounced cirrhosis of the liver.

In three cases there was no post-mortem evidence of trouble in the abdomen other than the chronic duodenal ulcer, and it is of interest that in each death was due to some form of cardio-vascular disease. From these observations I have become convinced that some definite relationship does exist between morbid conditions in the lower bowel and duodenal ulcer. From the varied character of the lesions found in the colon I think that it may be justly argued that the duodenal is the secondary lesion, and this in spite of the fact that the constipation so regularly found in cases of duodenal ulcer frequently disappears after a gastro-enterostomy. What exactly the nature of the relationship between the two conditions is is not so clear. Whether it be that toxic absorption produces a reduction of the antipeptic content of the blood, as Katzenstein⁷ suggested and Lieblein⁸ has shown to exist in cases of gastric and duodenal ulcer; whether it be a primary action on the duodenal mucosa through the blood or only indirectly through damage to the liver, as the experiments of Gundermann⁹ suggest, is uncertain. I am inclined to think, however, that it is in a combined action through the blood and through the autonomic nervous system that the connection is established.

Rössle,¹⁰ who recently published the results of a similar investigation to that which I have been carrying out, was struck by the frequent association of chronic appendicitis and duodenal ulcer—16 times in 33 cases. He believes the connection between the two conditions to be through the nervous system, the irritation of the chronically-inflamed appendix producing an irritable condition of the autonomic nervous system, expressed in the hypersecretion, the hypermotility, and the tendency to spasmodic contractions of the gastric and duodenal walls in the regions of the pylorus. The intensely interesting observations on the autonomic nervous system and the effect of drugs thereon recorded of recent years by Müller,¹¹ Eppinger and Hess,¹² Petró and Thorling,¹³ and others, and particularly the facts noted by von Bergmann¹⁴ regarding the irritability of this system and the increased vagotonus in cases of gastric and duodenal ulcer, are of importance in this connection, and there is some evidence to show that toxic absorption

from the colon has a definitely vagotonic influence. The periodicity of the symptoms of duodenal ulcer, the effect of worry, over-fatigue, and of chills and vasomotor disturbances in determining the onset of a fresh attack all point to the importance of the nervous factor in duodenal ulcer. The irritable state of the autonomic nervous system induced and kept up by a chronic lesion in the appendix or colon readily explains those conditions of appendix and colon dyspepsia which in many cases are the forerunners of gastric and duodenal ulcers. Whether we must postulate an initial toxic necrosis of the mucosa or its lymph follicles, or whether, as Beneke¹⁵ and Rössle maintain, hemorrhagic erosions may occur and develop into ulcers merely from reflex spasmodic contractions of the muscularis mucosæ, is a matter more of scientific than of practical interest. The important clinical point is, that from morbid conditions in the lower bowel functional and actual organic changes in the gastro-duodenal area may result, and that treatment, whether medical or surgical, must be directed to first causes as well as to secondary results.

SITE OF DUODENAL ULCER.

The most striking feature of duodenal ulcer is the regularity with which it is found in certain well-defined positions. The characteristic positions on the anterior and posterior walls half an inch beyond the pylorus claim probably 85 per cent. of all duodenal ulcers. The roof of the duodenum just beyond the pylorus is the other common site, whereas the remainder of the first part of the duodenum, although frequently the seat of scars of healed acute ulcers, is seldom found involved by a chronic ulcer. Several facts may be mentioned which have a bearing on this curiously selective character of duodenal ulceration.

Embryologically, the first part of the duodenum resembles the stomach in that it arises from the foregut. Its mucous lining differs from that of the rest of the duodenum in being practically devoid of folds. Further, this part of the duodenum is rich in lymph follicles, and there is some evidence that many acute duodenal ulcers originate in the breaking down of such follicles. This fact was borne in on me forcibly by the case of a boy, aged 11, who died under the anæsthetic during an operation for intestinal obstruction. A coil of small intestine had been loosely snared by an omental adhesion to an old inflamed appendix. At the post mortem it was found that the boy had a very pronounced degree of status lymphaticus. The lymph follicles in the pyloric end of

the stomach and first part of the duodenum stood out prominently, and on the anterior wall of the duodenum, half an inch beyond the pylorus, was an ulcer of some duration, whilst on the posterior wall just opposite was the scar of a healed ulcer. In acute infections, such as appendicitis, which have ended fatally, even though there be no duodenal ulcer, microscopic examination of the wall of the first part of the duodenum frequently shows breaking down of the central parts of the lymph follicles (see Figs. 3 and 4).

Exposure to Acid Content.—Radioscopy has shown that when food is taken into the stomach, almost immediately some of it is passed on into the first part of the duodenum, and that this onward passage is unusually rapid in cases of duodenal ulcer. On entering the roomy duodenal vestibule there is a slight pause in the onward course, and this gives the well-known appearance of the "duodenal cap" first described by Cole.¹⁶ In cases of duodenal ulcer this delay in the first part of the duodenum is more marked than normal, suggesting that there is some obstruction to the normal process of feeding of the more distal duodenum from the loaded vestibule, which Cole regards as a reservoir. Schmieden¹⁷ and Dunkeloh have laid great stress on this retention of acid chyme from the stomach in the first part of the duodenum in regard to the etiology of chronic duodenal ulcer. Obstruction at the first duodenal angle is, according to Quimby,¹⁸ a very common cause of gastric dilatation—it would certainly seem to be a contributing cause of duodenal ulcer. Kreuzfuchs¹⁹ has shown that in cases of uncomplicated duodenal ulcer, whilst there is almost invariably hypermotility of the stomach, with rapid emptying of the organ in the first hour or two after a meal, a certain residue of what appears to be the coarser part of the food remains for a longer period in the stomach. The initial period of active peristalsis and open pylorus is succeeded by a period of pyloric spasm with the escape of but small quantities of a hyperacid content into the duodenum. This is the period of late or hunger-pain so characteristically relieved by alkalies and belladonna. The primary stasis of a moderately acid content and the later arrival of small quantities of a hyperacid chyme are important factors in determining ulceration in the duodenal vestibule should any devitalised area of its mucosa be present.

Moynihan²⁰ expresses the opinion that the constancy with which chronic duodenal ulcer is found on the anterior wall just beyond the pylorus is probably to be explained by the impinging of the acid chyme on this spot as it is ejected from the stomach.

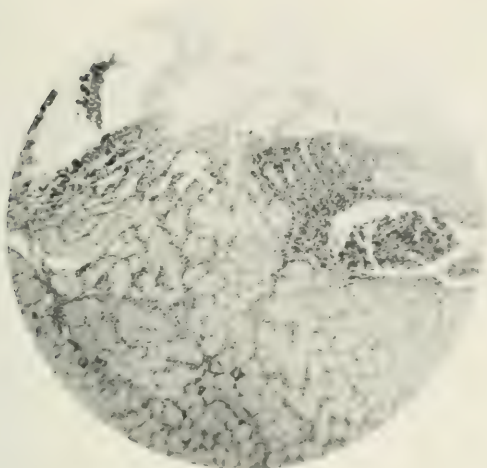


FIG. 3.—Photo-micrograph of duodenal wall showing breaking down lymph follicles.
From the duodenum figured above (Fig. 1).



FIG. 4.—Acute duodenal ulcer found in a fatal case of severe superficial burn. The patient lived for ten days after the accident.

The ulcer frequently found on the posterior wall just opposite the anterior one he regards as a "kissing" or contact ulcer. In regard to the first of these explanations, it is based on the view that "an enormous preponderance of ulcers occur on the anterior wall." Post-mortem evidence does not confirm this view, which is based on the examination of the duodenum from its external aspect. In regard to the so-called "kissing ulcers," I think it is very doubtful that they are contact ulcers. The active secretion which occurs in the duodenum, together with the fact that gas is very often present as well, make it unlikely that the anterior and posterior walls can for any length of time be sufficiently closely in contact to permit of direct infection.

Blood-Supply of First Part of Duodenum.—In a former paper I²¹ suggested that the blood-supply of this area of the duodenum might be responsible for the characteristic distribution of chronic ulcers. The situations of both the anterior and posterior ulcers correspond closely to the proximal boundaries of the areas supplied by the anterior and posterior branches of the supraduodenal artery. The anastomosis of the branches of this vessel with surrounding vessels, and especially with pyloric arterioles, is of the most sparing description. Any factor, such as arteriosclerosis, tension on the vessel, or spasm of the muscular coats of the bowel, which interferes with this vascular unit, will favour ulceration at the periphery of the area supplied by it, and in the subjects of duodenal ulcer the presence of such a factor is, I hope to show, not mere theory. Further, the local endarteritis of the terminal branches which results from ulceration in the duodenal wall must certainly tend to delay healing and to favour recurrence when healing does occur. The hyperemia of the peritoneal coat over a duodenal ulcer so constantly seen at operations after the duodenum has been handled or exposed to the air for some minutes cannot be taken as an index of the blood-supply of the whole thickness of the duodenal wall at this area under normal conditions with the patient in the erect attitude.

SEX INCIDENCE OF DUODENAL ULCER.

The relative frequency of duodenal ulcer in the male as compared with the female sex—in the operation statistics of Mayo and Moynihan it was approximately 4 to 1—was upheld in my post-mortem cases—33 males to 8 females. Such a constant ratio must depend on some constant and therefore probably structural difference in the two sexes. Such a difference is to be found in the form and position of the stomach and duodenum. In the

female the stomach is longer in its vertical axis, the pylorus is on a lower level, and the first part of the duodenum is longer and laxer than in the male (Figs. 5 and 6). Though notable exceptions will be found to this sex difference in the shape and position of the stomach, I have satisfied myself from the examination of several hundred bodies that it is sufficiently constant to justify the recognition of a male and a female type. This distinction, though not usually recognised by anatomists, is well known to surgeons, and makes the operation of pylorectomy a relatively simple operation in a female patient.

In a healthy subject whose abdominal muscles are in good tone the stomach, full or empty, is buoyed up by the intestines, and its supporting ligaments bear little, if any, strain. When, however, the tone of the abdominal muscles is either temporarily or permanently impaired, the viscera tend to sag downwards, and strain may be thrown on vascular supporting ligaments. The stomach is slung up in the abdomen by the two borders of the gastro-hepatic omentum, the left one containing the coronary artery, the right one, or hepato-duodenal ligament, usually containing the supraduodenal artery. The thin intermediate portion of the gastro-hepatic omentum can under no circumstances give support to the stomach.

Dunkeloh, in his X-ray observations on cases of duodenal ulcer, noted that a slight degree of gastropptosis was one of the constant features in such cases, a fact which Bier²² has previously noted. Tension on vessel-containing ligaments usually leads to slight anaemia, and anaemia to muscular spasm in the wall of the hollow viscus supplied by the vessels. The anaemic spot on the duodenum which Mayo²³ observed at operations when this viscus was pulled out into the abdominal wound is an excellent illustration of this point. This sequence of events, *i.e.*, tension on vessels, slight anaemia, and muscular spasm, will be particularly liable to occur in the stomach or duodenum of one who is the subject of hyper-vagotonus, and according to von Bergmann, patients who suffer from gastric and duodenal ulcer invariably show increased vagotonus. If, then, we grant that strain, however slight on the supporting ligaments of the stomach and duodenum, may occur, it can be very readily demonstrated that this strain will be distributed between the two ligaments according to the relative height of the two ends of the weighted viscus. When the pylorus is low and the duodenum long and lax, as in the female type, almost all the strain is borne by the cardiac ligament containing the



FIG. 1.—Male type of stomach, filled with food and gas. Note sharp bend at high pylorus, and strain on hepato-duodenal ligament.



FIG. 2.—Female type of stomach. Note long and low position of pylorus, and support borne by left border of gastro-hepatic omentum.

coronary vessels, whereas where the pylorus is situated relatively high up, where the first part of the duodenum is short and more or less fixed, a considerable amount of the strain is borne by the hepato-duodenal ligament containing the supraduodenal vessels (Figs. 5 and 6). On these lines one may explain why ulcer on the lesser curvature of the stomach is relatively common in women and ulcer in the first part of the duodenum relatively frequent in men. It may also explain why rest in bed is so essential for the effective medical treatment of both forms of ulceration. It may be argued against this explanation of the sex incidence of duodenal ulcer that not so very rarely a duodenal ulcer is found in a female with visceroptosis and an exaggerated feminine type of duodenum. I have operated on two such cases, but in both, although the pylorus was very low (level of umbilicus), the greater curvature of the stomach had sagged down very much lower, so that really one had to deal with what was, mechanically, almost a male type of stomach and duodenum. Moreover, it is not altogether rare to find in the same individual an ulcer in both those situations which are exposed to strain, namely, the lesser curvature of the stomach and the duodenum just beyond the pylorus.

CONCLUSIONS.

1. Duodenal ulcer is a malady of frequent occurrence and one which often passes unrecognised.
2. Although as a rule readily diagnosed, a chronic duodenal ulcer may occasionally exist and give rise to none of the characteristic symptoms, the first evidence of such a "silent" ulcer being sometimes its perforation.
3. "Silent" duodenal ulcers are met with most frequently in the subjects of arteriosclerosis, and are found for the most part on the posterior wall of the duodenum.
4. Some toxic or irritative factor, usually within the abdomen and most frequently associated with the colon or appendix, is found in a large proportion of cases of chronic duodenal ulcer.
5. Probably many acute duodenal ulcers are primarily follicular ulcers from the breaking down of inflamed lymph follicles.
6. Whatever be the primary cause of a gastric or duodenal ulcer, spasm of the muscular coats of the viscus is an important factor in determining its chronicity.
7. The situation of the opposing ulcers on the anterior and

posterior walls of the duodenum on the boundary zone of the areas supplied by the anterior and posterior branches of the supraduodenal artery suggests that a common vascular deficiency rather than a contact infection accounts for the peculiar tendency to chronicity and recurrence.

8. This vascular deficiency may be due to arteriosclerosis, but probably it is usually due to spasm of the muscular coats of the duodenum induced by a slight local anæmia consequent to strain on the supraduodenal vessels, this muscular spasm being favoured by the increased vagotonus and the irritable condition of the autonomic nervous system which exists in such cases.
9. The sex incidence of duodenal ulcer is to be explained on anatomical grounds. The relatively high pylorus and short fixed duodenum of the male allows of its vascular supporting ligament, the hepato-duodenal ligament, being exposed to strain, which in the female, with her relatively low pylorus and lax duodenum, is borne by the left border of the gastro-hepatic omentum and lesser curvature of the stomach.
10. The fixity of the male duodenum further predisposes to kinking at the first duodenal angle and thus to an unduly long exposure of its first part to the acid chyme from the stomach, undiluted by bile or pancreatic juice, the regurgitation of which is impeded.

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A BACTERIOLOGICAL STUDY OF TUBERCULOSIS OF
THE LYMPH GLANDS IN CHILDREN.*

(From the Royal College of Physicians' Laboratory, Edinburgh.)

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ONE of the most important public health questions to-day is the part played by the bovine bacillus in the causation of tuberculosis in man. The chief method relied upon in attempting a solution of this question is identification of the bovine bacillus in the human body. Whilst the majority of investigators in the same or different countries admit the possibility of such infection, their findings as to the actual extent of the disease are widely divergent. When considering the results of all such investigations, it is important to bear in mind that special conditions prevail in one country and not in another. The consideration of these in relation to the Edinburgh results I shall deal with later, but what I wish to emphasise at this point is (1) the possibility of different results being obtained according as the tuberculous material under investigation has been removed at autopsies or during life; (2) that the importance of the relative frequency of the bovine and human types of infection at the different age-periods has not been sufficiently recognised. Numerous observations on the prevalence of the two types have been made, but these mainly concerned tuberculosis in adults. When the disease has been investigated in children, the tuberculous material has usually been obtained from autopsies, and very seldom removed by surgical operation.

It seemed to me, with the knowledge at hand, that a study of the commoner varieties of tuberculosis affecting children would add to our knowledge of the true extent of bovine infection, and so give information of great importance in control of the disease. Accordingly, I commenced such an inquiry in January 1911. It was originally my plan to occupy myself only with tuberculosis of the cervical lymph glands; however, the opportunity to investigate tuberculosis of the mesenteric glands and also a large number of autopsies in children enabled me to undertake a systematic

* Read 17th July 1914 at the Edinburgh Congress of the Royal Institute of Public Health. The expenses of the research were in part defrayed by a grant from the Carnegie Trust, for which I desire to express my thanks.

and broader study of the entire subject. It is upon the results of my earlier investigations that my conclusions are mainly based. I shall also, to some extent, consider my later investigations, because they help to elucidate certain points in regard to tuberculosis in children.

In the present paper I propose to discuss the results of my investigations in regard to the relative frequency of the bovine and human types of infection—(1) in material obtained from autopsies in children; (2) in material removed during life. The material for the study of this subject has been obtained principally from the Royal Hospital for Sick Children, Edinburgh. The surgical material has come to my hand, without selection, through the kindness of Mr. Stiles. For the autopsy material I am much indebted to Dr. Carnegie Dickson, Pathologist to the Hospital.

I. *Autopsy Material*.—In the first place let us briefly consider—(a) the incidence of tuberculosis in the various groups of lymph glands as determined from a series of autopsies in children dying from all causes, and (b) the bacteriological characters of the tubercle bacilli which were found.

The total number of cases examined was 29, all being children under twelve years of age.

At each autopsy particular attention was directed towards the three chief groups of lymph glands—the cervical, bronchial, and mesenteric. Occasionally the tonsils were also examined.

The investigation consisted of (1) gross examination of the glands; (2) inoculations of guinea-pigs with emulsion of glands; (3) microscopic examination of glands.

It is not my intention to burden you with experimental data. As the investigation is not yet complete, I reserve for a subsequent communication description of the experiments and methods of investigation employed.

Summary of Results.—Cultures have been isolated from 12 of the twenty-nine cases investigated and tested as to their cultural characters and virulence for rabbits.

Eight cases yielded cultures of human tubercle bacilli; in 4 cases they were of the bovine type.

A. *Cases Yielding Tubercle Bacilli of the Bovine Type*.—Bovine tubercle bacilli have been isolated from four of the children. Three of these died from tuberculosis, the immediate cause of death being tuberculous meningitis. The other child died from intra-peritoneal hæmorrhage, the tuberculous lesions being found

at the autopsy. In the following table (Table I.) the details of the cases are summarised:—

TABLE I.

Cases Yielding Tubercle Bacilli of the Bovine Type.

No. of Case.	Age and Sex.	Characters of Disease.	Cause of Death.	Primary Seat of Disease.	Human Type of Bacilli Isolated.
12.	4 years, female.	Abdominal tuberculosis; meningitis.	T. meningitis.	Mesenteric glands.	Mesenteric and cervical glands.
26.	1½ years, male.	Tuberculous peritonitis.	Intra-peritoneal hæmorrhage.	Do.	Bronchial and mesenteric glands.
32.	3 years, male.	Tuberculous meningitis.	T. meningitis.	Do.	Mesenteric glands.
36.	2 years, male.	Tuberculous meningitis.	T. meningitis.	Do.	Mesenteric glands and meninges.

In the four bovine cases there was more extensive and advanced caseation of the mesenteric glands than of any other group of glands.

B. *Cases Yielding Tubercle Bacilli of the Human Type.*—Human tubercle bacilli have been isolated from seven tuberculous children and one not apparently tuberculous child. The tuberculous cases only are considered here.

In each case cultures were derived mainly from the cervical, bronchial, and mesenteric glands. Occasionally, however, cultures were also obtained from other parts of the body, and the different strains isolated were compared and found identical in cultural characters and virulence for rabbits. Four of the children died of miliary tuberculosis of the lungs and three of tuberculous meningitis. In six of the children the tuberculosis was most advanced in the thorax, the bronchial glands showing the more extensive disease; in the remaining case the disease was equally severe in the bronchial and mesenteric glands, possibly a case of simultaneous infection in the thorax and abdomen.

The details of the cases are summarised in the table which follows:—

TABLE II.

Cases Yielding Tubercle Bacilli of the Human Type.

No. of Case.	Age and Sex.	Characters of Disease.	Cause of Death.	Primary Seat of Disease.	Human Tubercle Bacilli Isolated from
7.	4½ years, male.	General tuberculosis.	T. meningitis.	Bronchial glands.	Tonsils, cervical, bronchial, and mesenteric glands.
8.	4½ years, female.	Do.	Miliary tuberculosis of lungs.	Do.	Tonsils, cervical and bronchial glands.
9.	1½ year, female.	Do.	Do.	Do.	Axillary, bronchial, and mesenteric glands.
17.	2 years, female.	Tuberculous meningitis; general tuberculosis.	T. meningitis.	Do.	Bronchial and cervical glands.
19.	6 years, male.	General tuberculosis.	Do.	Uncertain.	Tonsils and mesenteric glands.
25.	1½ year, female.	General tuberculosis.	Miliary tuberculosis of lungs.	Bronchial glands.	Tonsils, cervical and bronchial glands.
37.	1½ years, male.	General tuberculosis.	Miliary tuberculosis of lungs.	Do.	Cervical and bronchial glands.

C. Cases with no Visible Lesions of Tuberculosis.—The bronchial and mesenteric glands of 18 children who presented at autopsy no visible lesions of tuberculosis were tested on guinea-pigs for the presence of tubercle bacilli. In thirteen of these cases the cervical glands, and in two the tonsils, were also tested.

Tubercle bacilli were demonstrated to be present in a single case in the bronchial glands of a child aged four years; the bacilli were of the human type.

I have previously referred to the incompleteness of this part of the inquiry. It is evident that the number of cases investigated is too small to permit of reliable deductions. Still the results, such as they are, indicate the seriousness of the mortality in childhood directly attributable to tuberculosis. Further, besides showing the greater importance of the human bacillus as a contributor to the mortality rate in children, they illustrate also the danger of cows' milk as a source of tuberculosis in children.

II. Surgical Material.—The cases of tuberculosis to be con-

sidered now are those in which the invasion has taken place, either through the mouth or throat into the cervical lymph nodes, or through the intestinal mucosa into the mesenteric nodes.

In the first place I wish to call attention briefly to the subject of tuberculous cervical glands in children—a very frequent disease in Edinburgh, which I have studied on a large scale, and reported on in the *British Medical Journal* of 17th January 1914. Since then additional cases have been examined, and are included in the following figures. Eighty consecutive cases have been investigated; of these 42 resided in Edinburgh, and 38 came from neighbouring country districts (within a radius of 30 miles).

Of the 80 cases, the bovine bacillus was present in 71 instances (88 per cent.), and the human bacillus in 9 (12 per cent.).

Without exception, the cases were those of children twelve years of age and under. The maximum incidence occurred during the second year of life. This is not surprising when it is recalled that the large majority of children of this age are nourished in whole or in part on cows' milk. I found that, in my series of cases, 84 per cent. of the children two years and under had been fed with unsterilised cows' milk since birth. Whatever may be the case in other countries, the mode of feeding children in Britain, especially Scotland, is such as to favour bovine infection. That a large proportion of Scottish babies are bottle-fed, and that it is the exception rather than the rule to sterilise the milk, are factors the significance and importance of which have not been fully recognised by many investigators in other countries.

Most of the cases were brought to hospital on account of a lump in the neck, which had been present for a varying period. The average duration of the illness before surgical advice was sought was seven and a half months. There is seldom any interference with the general health. It cannot be said that there is one type of child especially liable to this disease. A noteworthy fact is that, in the large majority of cases, the patients, apart from the glandular enlargement, are in robust health, and show no clinical evidence of tuberculosis elsewhere in the body. In only 9 cases was it observed that the child looked delicate and presented the characteristic tuberculous facies. Further, it is not at all rare for a single member of an otherwise apparently healthy family to exhibit the disease. In 16 instances "an only child" had developed the disease. The influence of infectious diseases, notably measles, whooping-cough, and scarlet fever, in apparently favouring the dissemination of the disease in the glands is so

well known that I merely mention it. This relationship was noted in 15 cases.

A careful search was made in every case for the existence of pulmonary tuberculosis in the parents and other members of the household. When such a focus exists in any family it must constitute a probable and most dangerous source of infection.

Thus amongst the children harbouring the human bacillus the opportunity for human infection could, as a rule, be established.

As regards the bovine cases, it seems more than a coincidence that in not a single case was there a history of pulmonary tuberculosis in other members of the family. In sixteen cases, however, one or more of the children in the respective families were affected with various forms of surgical tuberculosis.

Let us next consider cases of abdominal tuberculosis in children. In this study recently begun I have included only those cases in which the diagnosis is tuberculous peritonitis or tuberculous mesenteric gland disease, and not cases where the abdominal affection is part of a generalised tuberculosis.

Out of eight cases observed up to the present, seven have proved to be of bovine origin, and one of human origin. All the children were under twelve years of age, and had been fed on raw milk. It is interesting to note that in the human infection the father of the patient suffered from chronic pulmonary tuberculosis.

It is evident from the results which I have briefly outlined that the bovine type of tubercle bacillus plays a significant part in the causation of cervical lymph node and abdominal tuberculosis amongst children residing in Edinburgh and district.

In a series of cases of glandular tuberculosis in children yielding such a high percentage of bovine infection it seemed to me very desirable that an exhaustive inquiry should be made as to the prevalence of tubercle bacilli in the Edinburgh milk supply, particularly that portion derived from country districts. The results of such an inquiry recently carried through showed that of 406 samples of mixed milk collected from the same number of milk shops, 82 samples (20 per cent.) contained tubercle bacilli.

In the foregoing I have presented the evidence that I have been able to collect in regard to the occurrence of the bovine and human types of tubercle bacilli in the lymph glands of children. This evidence is sufficient, it appears to me, to warrant certain conclusions, as follows:—

1. The results of inoculations with autopsy material, on account

of the small number of cases investigated, cannot be considered conclusive as to the relative frequency of the bovine and human types of infection. But so far as they go, they furnish evidence that in cases of fatal tuberculosis in children the human bacillus is the main contributor to the mortality rate.

2. Having demonstrated that a considerable proportion of the tuberculosis affecting children in Edinburgh and district is of bovine origin, more particularly that which affects primarily the mesenteric and cervical glands; that the milk supply of the same area is frequently infected with bovine tubercle bacilli; and having demonstrated that a certain number of deaths occur from this bacillus, I am of opinion that bovine tuberculosis can no longer be considered a negligible factor in respect to the spread of tuberculosis amongst children, more especially since unsterilised cows' milk in Scotland is a vehicle by which tubercle bacilli must very frequently be introduced into the bodies of children. In short, I maintain that the campaign against tuberculosis must include the bovine sources.

3. It is to be hoped that the high degree of tuberculous contamination which I have found in the Edinburgh milk supply, and the concrete figures which I have submitted, may prove an effective argument for those who are striving with our legislators in the cause of pure milk.

THE HEALING PROCESS OF THE INFANTILE BRONCHIAL GLANDS TUBERCULOSIS.*

By PROFESSOR E. RIST, M.D., Paris.

It is a well-known fact that enlargement and caseation of the bronchial and mediastinal glands are among the most conspicuous morbid changes observed in tuberculous children—so conspicuous indeed that, up to recent years, they have often been considered to be the primary lesion of infantile tuberculosis. The modern researches of Kuss, of Albrecht, and of Ghon have proved—and, in my opinion, definitely proved—that they are always caused by and consecutive to an initial tuberculous lesion located in the lung itself. Still, the pulmonary focus is sometimes so small that, post-mortem, it can only be detected after a most painstaking investigation. There is generally a remarkable disproportion between its minuteness and the size and number of the tuber-

* The pathological researches of which this paper gives an abstract have been conducted at the Larrière Hospital, Paris, in collaboration with Dr. P. Ameuille.

culous glands at the root of the lung. For it is quite exceptional to find one gland or one group of glands only affected. If there is a single pulmonary focus, the glands belonging to the lobe in which it is located will of course be affected; but the glands of the other lobes of the same lung will also be diseased, and so will be the glands along the trachea, and even, in a large proportion of cases, the glands of the opposite lung.

In the diseased glands caseous degeneration is commonly observed; it may affect only a part of the gland, but in the greater number of cases, when death has been caused by tuberculosis, the whole of the enlarged gland is caseated. The caseous mass is lined by fibrous tissue, which adheres very firmly to the neighbouring organs—oesophagus, trachea, bronchi, blood-vessels, nerves—and especially to the neighbouring lymph glands.

Now, among the many children whose bronchial and mediastinal glands are tuberculous, only a small proportion die. The majority of them recover, often without having even exhibited any definite clinical symptoms, and are more or less immune for their lifetime; they grow up to be the average healthy civilised adults. Yet, among those who recover, an important percentage are re-infected later on, and become the young or adult consumptives. My object is, not to bring any new argument in favour of this now firmly-established doctrine, but, taking it for granted, to put before you another problem, which, in spite of its interest, does not seem to have attracted much attention, namely, what becomes of the tuberculous bronchial glands of children who recover? What are the changes which take place in them? or, in other words, what trace do we find in the adult of the glandular tuberculosis of the child?

That caseous degeneration of the bronchial glands is far from being fatal is proved by the great number of post-mortems where such lesions are found in children having died from anything but tuberculosis. Furthermore, the X-ray examination of otherwise healthy children having a positive Pirquet often shows us those very dark and well-defined patches along the larger bronchi or at the root of the lungs which are so characteristic of calcified glands; and we know that calcification, as a rule, takes place only in glands which have been previously caseated. But calcification does not necessarily take place in the healing process of caseous glands. To study this process, one has to compare the lesion of bronchial glands of the child with those of the consumptive adult.

The differences are very striking; the disproportion between

the pulmonary and the glandular lesion is reversed in the adult. Extensive, ulcerous, long-standing tuberculosis of the lung is generally found at the post-mortem, coincident with bronchial glands of normal size or hardly enlarged. Instead of being fixed to the surrounding tissues by a strong fibro-adhesive reaction, the bronchial glands are easily enucleated. Finally, and this is most important, they are hardly even affected with caseous degeneration. Among more than 400 adult cases examined post mortem by my friend Dr. Ameuille and myself, caseation of the bronchial glands was found in three cases only, and they were young individuals, their ages being respectively 18, 24, and 34 years.

This remarkable scarcity of caseous bronchial glands in pulmonary phthisis of the adult has been noticed by several authors, especially by Baumgarten and by Horton-Smith. Dr. Theodore Shennan, of Edinburgh, has also mentioned it in his admirable report on the "*Morbid Anatomy of Tuberculosis in Man*," which he read at the Berlin Tuberculosis Conference last year.

As a matter of fact, the macroscopical appearance of the bronchial glands in pulmonary tuberculosis of the adult has nothing very characteristic. They are generally rather soft, a little oedematous; their colour is a mixture of various shades of grey, with black anthracotic patches. Some are quite black. The glands which are in the vicinity of the lung lesions do not differ essentially from the glands belonging to the remaining sound parts of the lungs, the result being that it is quite impossible to decide—from the macroscopical appearance—which glands are diseased and which are not.

How is this extraordinary contrast between the lympho-glandular reactions to lung tuberculosis in the child and in the adult to be accounted for? Köhler explains the infrequency of caseation of the glands in the adult on the ground that the lymphatic channels become obliterated by the chronic inflammatory processes going on to scar formation, which always accompany the more chronic forms of pulmonary tuberculosis. But this would not elucidate the fact where there is absolutely no fibroid formation, the more or less acute cases of consumption, the caseous pneumonias where no caseous transformation of the bronchial glands can be detected.

Another explanation which occurs to the pathologist's mind is the following:—Almost every child living in civilised cities

gets infected with tuberculosis, the primary focus being, in the greater majority of cases, located in the lung, and consequently followed by tuberculosis of the bronchial and mediastinal glands. In the children who recover, the glands get sclerotic and are transformed into a fibro-anthraxotic node, which has lost all the properties of a normal lymph gland and is therefore incapable to react again.

This theory would have much in its favour if the glandular lesions of the chest were always as generalised and as complete in infantile tuberculosis as we see them at the post-mortems of fatal cases. Indeed, one may meet post mortems of clinically non-tuberculous adults, where all the mediastinal and bronchial glands are sclerotic, hard, black, more or less calcified, and adherent. But this is exceptional in the clinically non-tuberculous adult. As a rule, scars of healed tuberculous lesions are to be found in a small number of glands in each adult case, and they occupy a part only of the gland, the rest of which is sound or nearly sound. The scars, which one has the opportunity of studying in adult post mortems, are little hyaline masses more or less hidden in some part of the gland; they are often anthracotic and partly calcified.

The comparative study of glands at different stages of the healing process shows how the scar formation is gradually completed; from the peripheral fibroid tissue which lines the central caseous mass bundles penetrate into this mass, which finally gives the colouring reactions characteristic of collagenous substance. These bundles are not exactly like connective-tissue bundles; they are less precisely limited and fibrillated; neither cellular elements nor elastic fibres can be found in their midst. It can hardly be said that there is a real sclerotic transformation of the gland; one would, I think, more accurately call it a hyaline degeneration. During this healing process, which, of course, requires a long time in each individual case, the tuberculous follicular formations, which are a characteristic feature of the peripheral fibroid part of the caseous gland, gradually disappear.

Now, as I said before, these scars are to be found in a small number of glands only, and they very often occupy a limited portion of the affected gland. The rest of it is as normal as one can expect an adult bronchial gland to be normal. At any rate, it has preserved its physiological faculty of reacting to disease affecting the lung territory to which it corresponds. For instance it will become cancerous if there is a cancer of the lung or the

bronchi. In cases of lobar pneumonia the corresponding bronchial glands get inflamed and enlarged to a considerable degree, even if a tuberculous scar is hidden in their midst. We have sections showing this fact very plainly. It is, therefore, not correct to assume that those glands, in consequence of the healing-up process of infantile pulmonary tuberculosis, have lost their function, have become sclerotic throughout, and utterly unable to react. Indeed, they react normally to any disease except tuberculosis.

I do not mean to say that they are not affected at all by tuberculosis. If we examine those glands in cases of typical pulmonary tuberculosis of the adult we find them transformed into masses of little cells which are indisputably of the epithelioid type, although they differ in some respects from the epithelioid cells which are typical of follicular tuberculous formation. Follicular formations are rare and incomplete in the adult tubercular lymph gland; caseation is to be found only in minute microscopical spots; fibro-sclerotic productions are absent. It is therefore clear that, microscopically as well as macroscopically, the bronchial glands of the tuberculous adult are absolutely different from the bronchial glands of the tuberculous child. As I have pointed out before, it is not because they have become unable to react. But we are led to admit that their mode of reaction to tuberculous infection has been specifically altered.

In other words, here we have an obvious illustration of this condition which plays such a conspicuous part in the natural history of tuberculosis, and which Professor von Pirquet described under the singularly fortunate name of allergy. It is the same condition which protects the mucous membrane of the mouth and of the tongue of the consumptive patient against tuberculous infection, which makes tuberculosis of the skin, in such exposed parts as the hands, for instance, so extremely rare an occurrence. And, what gives to infection of the windpipe or of the bowel in the consumptive such an ominous significance, is precisely that it points to a disappearance of this allergic condition.

One has sought to account for the predominance of caseation in the bronchial glands of the child by referring it to an assumed greater activity of the lymphatic organs in childhood, to all kinds of organs and more or less abstract differences between the infantile and adult organism. I think we are nearer the concrete truth in assuming that caseation of the bronchial glands is not a

specific character of childhood but of primary tuberculous infection. If, on the other hand, pulmonary tuberculosis of the adult is, as a rule, not accompanied by caseation of the corresponding bronchial glands, it is not because the lymph glands of the adult are essentially and physiologically different from those of the child, but simply because pulmonary tuberculosis of the adult is due to a *re*-infection.

BRONCHOGENEOUS, PLACENTOGENEOUS, DERMATOGENEOUS, AND ENTEROGENEOUS INFECTION WITH TUBERCULOSIS IN INFANCY.

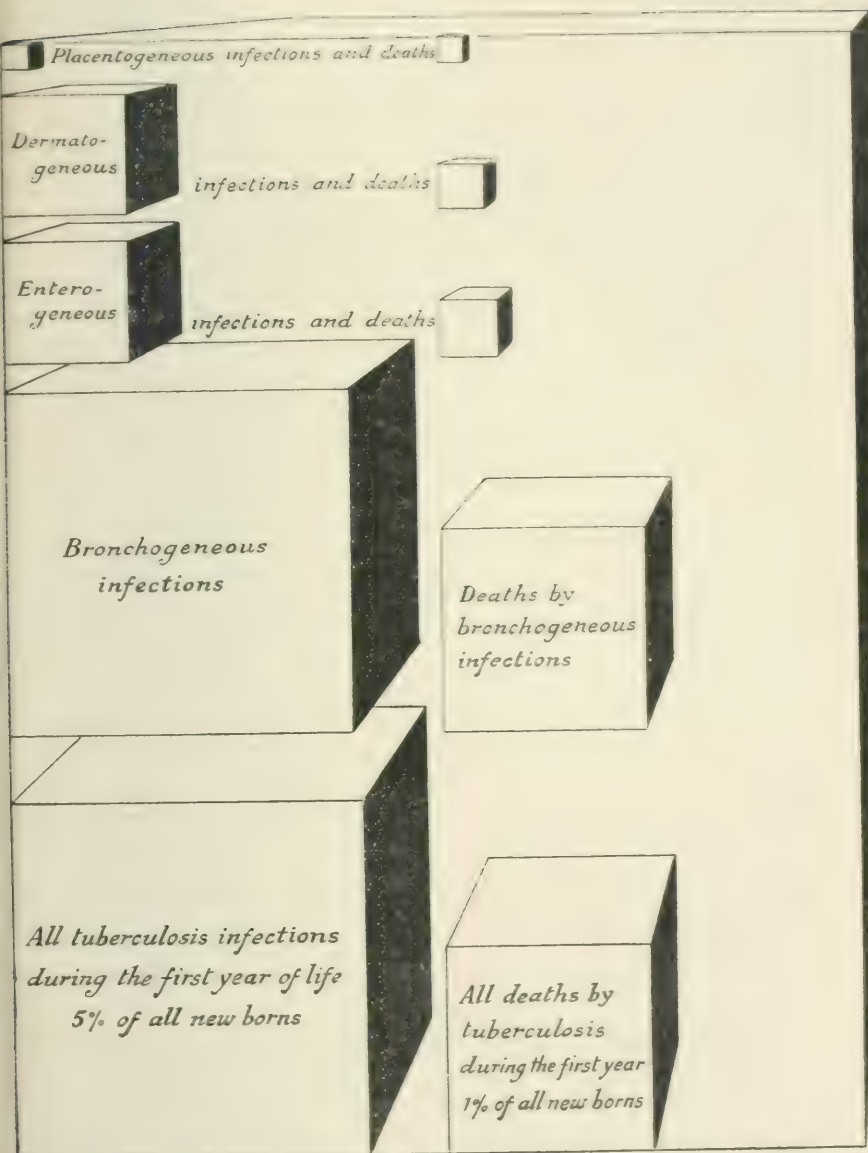
By PROFESSOR C. VON PIRQUET, Vienna.

DURING the last ten years, in the University clinic for children in Vienna, our attention has been especially directed to tuberculosis of infants. Hamburger and Ghon made investigations about the frequency, Escherich and Sperk worked up the clinical side, Schick the tuberculosis of the bronchial glands, and Sluka and Rach the X-ray findings. We were able to make a diagnosis very early, as we made routine cutaneous tests in every case as a part of the examination. This was corroborated by post mortems made in a most thorough and precise way by Ghon. Zarfl utilised the enormous amount of material in the Austrian Foundlings' Home, and was here able to demonstrate the youngest focus of extra-uterine infection and the earliest date of positive tuberculin reaction. Herbert Koch lately made a collection of all our cases of tubercular meningitis and of tuberculosis in infancy.

In this paper I want to deal with the portals of infection of tuberculosis. Permit me to say at the beginning that of all the 131 cases which were under our clinical observation, in all of them the tubercle bacilli apparently entered the body through the respiratory organs and caused first a lesion in the lungs. This form I call bronchogeneous infection.

Our material corresponds absolutely to the ideas of Kuss, Albrecht, and Ghon, who, by their post-mortem findings, came to the conclusion that this kind of infection is by far the most frequent. Bacilli inhaled in extra-uterine life make a primary effect in the lungs. From this focus first the regional lymphatic glands and then the other parts of the body are infected.

How about the portals of infection during uterine life? Theoretically speaking, the fetus could get germs from the ovum or the sperma or through the liquor amnii. In actual fact, however, we have no real proof of a germinal transmission. What certainly happens



INCIDENCE AND MORTALITY FROM TUBERCULOSIS IN INFANTS. DIAGRAM SHOWING APPROXIMATE PROPORTIONS OF DIFFERENT CHANNELS OF INFECTION AMONG THE INFANTS OF VIENNA.

sometimes is an infection through the placental vessels—placentogeneous infection. Besides this, in even fewer cases, an infection by aspiration of the liquor amnii—that is, an early bronchogeneous infection—may also occur. At the best, foetal transmission is extremely rare. In spite of the interest taken by the pathologists and clinicians, only about 20 certain cases in all have been collected in the literature by Cornet.

Placentogeneous infection causes no distinct primary effect. On post mortem, the lymphatic nodules of the liver and adjacent parts show the most advanced development. Clinically, these cases as a rule were under weight at birth, and soon began to waste away, showing fever, meteorism, and some tuberculides on the skin, whereas the lungs were free from symptoms. Herbert Koch points out that these cases show no cough, which is one of the earliest and most constant symptoms in the ordinary bronchogeneous infection. In the case of Zarfl a very early tuberculin reaction was found on the 17th day, whereas extra-uterine infection does not show this symptom before the second month of life.

The prognosis is absolutely bad, theorising worthless, and the diagnosis can practically be made only by post mortem.

After birth, *in the first days of life*, the following kinds of infection have been particularly met with:—Inhalation of bacilli from the parents or the midwife, and infection of the skin by the ritual circumcision. There are only a few cases in which we are able to give an exact date for the day of infection from the parents. In our own material a tubercular mother must have infected her baby in the first 3 hours of life, because she left the house afterwards; and a tuberculous father caused the infection the first week, after which he went to the hospital. Much more precise are the reports about infection by circumcision and by midwives. These have the value of experiments.

In ritual circumcision, blood is sucked by the performer from the wound of the penis. Forty-two cases of infection by this means have been collected and reported by Holt of New York. The consequence is the formation of an ulceration and intense swelling of the inguinal glands, accompanied by constitutional symptoms of more or less severity but not always fatal. Sixteen of these cases died, most of them in the sixth month. Six of the cases completely recovered.

A bronchogeneous infection in the first days of life seems to be invariably fatal. There is a very interesting report—before

the time of knowledge of tubercle bacilli—by Dr. Reich, a German Government physician. He was struck by the fact that several infants of healthy parents died of tuberculous meningitis. It was discovered that the same midwife had assisted at these confinements, and that she had an open tuberculosis. It was also learned that part of her technique was to suck the mucus out of the mouth of the new-born and afterwards blow air into the lungs of the child. Ten children treated this way in the year of 1875-76 died of tubercular meningitis—seven of them at the age of 3 and 4 months, and the rest later (6, 9, and 16 months).

After the first week and during the first year of life a great number of infections occur, and apparently mostly through bronchogeneous infection.

The primary infection of the intestinal canal (enterogeneous infection) has been much over-estimated after Behring's theory of infection by cows' milk. Intestinal tubercular invasion in post mortems on infants is very common, but as a rule secondary and due to the deglutition of tubercular mucus which comes from the lungs. Albrecht and Ghon have shown decidedly that in very scrupulous examinations of the lungs in most cases an old focus is found, and the bronchial glands show an earlier invasion than the mesenteric glands.

A certainly proved primary intestinal infection is rare. Albrecht found it to be only 0.7 per cent. (7 cases in 1060), and Ghon 1 per cent. (3 out of 189). Thus we see very few cases in Vienna. On the other hand, the English and the American observers give much higher figures—Councilman says 37 per cent. The difference may be due in part to the fact that in Vienna the milk is usually boiled, whereas in the other countries this is not always the case. One thing is certain, however, and that is, that at least in Austria and Germany infection by cows' milk plays no considerable part in infant tuberculosis. So we come back to the views of Robert Koch on this point.

There is apparently no characteristic clinical picture of a primary intestinal tuberculosis. General atrophy, with a big abdomen corresponding to the old "tabes mesenterica," has been found; but the cases with a post-mortem proof are not numerous enough to make a definite statement.

Primary infections on other mucous membranes are extremely rare. Against the views of those who have held that the tonsils were a frequent port of entry, it is important to mention that Albrecht found only 3 in 1060 (about 0.3 per cent.), and this

includes the nose, the mucous membrane of the mouth, and the tonsils. Ghon found one case in 189 (or 0·5 per cent.) from tonsils. The primary lesion shows an ulceration, and the lymphatic glands are intensely swollen, just as we have in primary infections of the outer skin. These are also rare cases.

Besides the cases of infection by circumcision as mentioned, we have primary lesions of the cheeks as related by Hamburger and Chancellor. In the Chancellor case a girl of two months was infected by the bite of a tubercular nurse. Epstein reports a tubercular ulcer of the ears following piercing for earrings.

After speaking of all these rare events we come back to the routine method—the bronchogeneous infection—which certainly has an enormous influence in infancy. In Vienna about 1 per cent. of all the infants die of tuberculosis in the first year of life; in London about half as many. The largest part of bone tuberculosis and scrofulosis of later childhood are due to infection in infancy, as infections later on seem to be comparatively innocent.

A complete statement of the clinical and anatomical features of bronchogeneous tuberculosis would keep us too long. I desire to give you only a brief outline or skeleton, such as distinguishing the primary focus in the lungs; extension by lymphatics and contiguity to and through the same and neighbouring organs; involvement of glands and pleura; retrograde extension by coughing to other parts of the lungs and different parts of the respiratory tract, as throat, nose, ears, etc.; the extension along the intestinal canal by deglutition of sputum; and, finally, the invasion of the body in the blood-stream, which leads to a general or local miliary tuberculosis or to single metastasis (bone, skin, etc.).

Besides, we have to consider the reaction of the organism against the invading micro-organism—the allergy which is shown by hypersensitiveness towards the tuberculous poison and leads clinically to fever and catarrhs of the respiratory and intestinal organs. On the other hand, this allergy means sensibility to tuberculin, and makes possible the tuberculin test upon which we depend chiefly for our diagnosis of infant tuberculosis. The general prognosis depends upon the age of the infant and the location of the primary focus. The younger the child the worse the prognosis. A placentogeneous infection seems to be always fatal, as does also bronchogeneous infection of the new-born. Infections of the other parts of the body and infections in

the latter part of the first year are also serious. Invasion of the blood-stream occurs in most of the cases.

As a conclusion, we may say:

That for the first year of life the bronchogeneous infection with tuberculosis is by far the most frequent way of entry (about 95 per cent. of all infections).

The enterogeneous infection is not important—at least, not in Austria (1 per cent. to 2 per cent. of all infections).

A placentogeneous infection of the foetus is a rarity, as is also stomatogeneous and dermatogeneous infections.

Prophylaxis of infant tuberculosis has chiefly to deal with the separation of the nursing from the coughing adults.

GLUTEAL AND CRURAL TYPES OF FIBROSITIS: THEIR RELATIONSHIP TO SPURIOUS AND GENUINE SCIATICA.

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FIBROSITIS in the lower extremities may be widespread, implicating both upper and lower segments of the limb. More commonly, however, the morbid process is localised to the gluteal muscles or to those of the thigh, but sometimes it involves only the peroneal and calf muscles, or more rarely the plantar muscles of the feet.

As in other regions it seldom restricts itself solely to the muscles, but generally invades the fascial coverings which envelop and permeate the limb in the form of intermuscular septa. Occasionally, too, the fibrous capsules of the joints or the similar coverings of the nerve trunks are coincidently or secondarily implicated. Hence the clinical picture presented is hardly ever a pure unalloyed one of so-called muscular rheumatism or fibrositis, but rather one in which the muscles, fasciæ, and nerve sheaths are affected, the changes in the muscular structures, however, predominating.

GLUTEAL FIBROSITIS.—The gluteal region is one of the sites of predilection, and because of the intimate bearing of the fascial layers of the buttock on the symptomatology of the affection a brief digression will not be out of place.

The deep fascia of the buttock—an extension of the fascia

lata—is a structure of much importance. Tethered above to the iliac crest, sacrum, and coccyx, it descends in front over the gluteus medius, extending as far as the anterior border of the gluteus maximus, at which level it divides into two layers, which pass over and beneath this great muscle. While the gluteus maximus is thus enclosed between two layers of fascia the subjacent gluteus medius and minimus lie in an osseo-aponeurotic space, which is closely sealed above, but open below towards the thigh and also internally at the sciatic foramen. We see, therefore, that symptoms due to increased tension will readily be evoked by any inflammatory process located in the lesser gluteal muscles, as the effused products will be pent up between a layer of bone on one side and a sheet of dense fascia on the other. Hence the frequency with which so-called fibrositis of the buttock gives rise to sciatic pains, the unyielding nature of the surrounding tissues directly favouring the production of pressure symptoms. Apart, moreover, from these sciatic pains due to mere mechanical influences, a direct extension of the morbid process to the sheath of the sciatic trunk is rendered easy by the fact that the osseo-aponeurotic space, in which the gluteus medius lies, freely communicates with the sciatic notch through which the nerve emerges. The importance of the foregoing anatomical considerations resides in this: that though all the gluteal muscles are liable to fibrositis the morbid process is especially prone to develop in the sheaths or substance of the gluteus medius. Clinically, too, it throws a light on the genesis of sciatic neuralgia and neuritis, many instances of which supervene secondarily to a more or less diffuse fibrositis of the fascial and muscular layers of the buttock. We have a precisely analogous condition in the shoulder, in which a widespread fibrositis of the deltoid muscle may through pressure by nodules or direct extension of the pathological process give rise to a brachialgia.

Etiology.—If we except instances due to direct blows or falls on the buttock, gluteal fibrositis is almost always traceable to exposure, and with notable frequency its onset directly follows sitting in a damp place or in wet clothes. This may or may not be associated with excessive use of the gluteal and crural muscles such as is incidental to occupations which involve frequent stooping and rising.

Clinical Features.—The onset of the malady is generally gradual and insidious, but in the more acute types the subject may be able to fix the time of its oncoming almost to an hour.

It is ushered in by a sense of aching and stiffness in the gluteal region which often spreads down the thigh. The discomfort is aggravated especially by flexion or lateral inclination of the trunk away from the affected side. When asked to indicate the actual site of the pain the subjects do not refer it with any degree of precision to the point of emergence or course of the sciatic nerve. On the other hand they invariably map out with the palm of their hand the origin, course, or insertion of one or more of the gluteal muscles. If the pain extends down the thigh, it is usually referred to the outer side, either along the tensor vaginæ femoris or the vastus externus. In other instances it follows the course of the biceps cruris, but only rarely that of the semitendinosus, and in the case of the former site the pain is usually prolonged over the outer head of the gastrocnemius.

The salient point to grasp in these cases is that the patient when asked to locate the pain refers it definitely to the *muscles* and not to the course of the sciatic nerve. Moreover, when the pain shifts or moves, its path may usually be traced from one muscle through its fascial expansions to another. Again, there are—at any rate in the early stages of gluteal fibrositis—no complaints of tingling and numbness or “pins and needles” in the leg or foot such as are met with in genuine neuralgia. These features support our contention that the morbid process chiefly affects the superficial and deep aponeurotic coverings of the gluteal muscles, and in some cases of the tensor vaginæ femoris and hamstring muscles. Not a little misapprehension as to the true site of the pathological change is, we believe, assignable to the habit of not allowing the patient himself to locate his painful sensations. Far too frequently the examiner proceeds straight away to seek the signs of local nerve tenderness by digging fingers or fist into the gluteal or crural regions, and in this way an erroneous impression is often gained as to the site of the disorder.

The subject of gluteal fibrositis is rarely at first incapacitated for exercise, but his discomfort is invariably aggravated by such. If he lies up in these early stages he usually gets well, but too often, under the delusion that the pain will pass off spontaneously, he allows the mischief to proceed unchecked.

Ultimately the pain, instead of being as at first referred to muscular or fascial structures, tends to localise itself more and more exactly to the track of the sciatic nerve to whose sheath the morbid process has now extended. If at this period the subject be asked to locate his pain he will not, as in the earlier stages,

draw the *palm* of his hand over the buttock and back of the thigh, but will, on the other hand, with his *finger-tip* accurately map out the course of the sciatic trunk. At this stage increasing suffering and disability ensue, with sensory paræsthesiæ referred to the area of distribution of the sciatic nerve, as well as other signs and symptoms of true sciatica.

On the objective side examination of the affected region usually reveals the presence of strands or nodules in the gluteal muscles and fasciæ, the outcome of the long-continued fibrositis.

To allow of satisfactory palpation the patient should recline on his sound side. The affected limb should then be abducted and over-extended, and this preferably by an assistant who at the same time keeps the knee flexed. In this way complete relaxation of the gluteus maximus will be secured, and palpation not only of this muscle but of the underlying gluteus medius will be greatly facilitated.

In the case of the gluteus maximus nodules or infiltrations may be detected at its upper margin, but more often at the level of its lower border, which, as we know, lies considerably below the fold of the buttock. If their presence here can be excluded we should then proceed to palpate carefully the superior curved line, the site at which nodules most commonly develop in the gluteus medius or its sheath.

CRURAL FIBROSITIS.—Apart from the spurious sciatic pains associated with gluteal fibrositis we have to bear in mind that similar inflammatory deposits are very prone to develop in certain of the thigh and leg muscles, and in the same way the local and referred pains they produce are frequently confounded with true sciatica. In the thigh the fascia lata completely invests the limb, this fibrous covering being more highly developed on its outer aspect, where it forms the ilio-tibial band.

This structure is a favourite site for fibrositis, and the aching and stiffness produced may be considerable. The discomfort is especially marked when walking or standing, as during their performance this fascial band is rendered more tense. The nodules or diffuse infiltrations are easily detectable by palpation, and are more common in the lower half of the membrane. When located in its upper portion the symptoms produced are those typical of neuralgia paræsthetica, and due, we believe, to compression of the external cutaneous nerve as it pierces the inflamed aponeurosis. Despite the location of the pain on the outer side of the thigh these cases are quite commonly dismissed as examples of sciatica.

Occasionally the tendinous insertions of the hamstrings and the fascia covering them become thickened and knotty, and frequently we have observed instances in which the aching and stiffness at the back of the thigh and popliteal space have erroneously passed muster as genuine sciatica—a fallacy all the more likely—if, as not uncommonly happens, the condition is associated with similar changes in the gluteal muscles or fasciæ.

In the leg myositic deposits are most commonly met with in the muscles of the calf and the peronei, and in the case of the former are more frequently situated in the inferior third of the inner portion of the belly of the gastrocnemius.

To facilitate palpation of the gastrocnemii the patient should lie on his side, the affected limb uppermost, the knee meanwhile being strongly bent and the ankle held in a position of slight plantar flexion. By thus approximating its bony attachments relaxation of the affected muscle is attained. The thumbs or tips of the fingers being then drawn gently but firmly over the surface, the presence of indurations can usually be ascertained.

Should the first examination prove futile owing to hypersensitiveness, it will usually be found that on repeated handling greater tolerance is established, and deeper palpation being feasible, the nodules embedded in the muscles can be distinguished.

For purposes of comparison the opposite calf muscles should be palpated also, as only in this way can slight departures from normal be recognised. The fibrous overgrowths when situated in the belly of the muscle tend to take the form of strands or cord-like thickenings. These may run the whole length of the muscle, the diseased fibrous bundles stretching from the origin to the insertion, or they may be more circumscribed, forming oval thickenings whose long axis coincides with that of the affected muscle.

Indeed, where the induration is deeply situated, its tendency to run parallel with the fasciculi of the affected muscle may be used to determine the particular muscle in which it is located.

This is especially valuable, for example, in fibrositis located in deep-seated muscles such as the levator anguli scapulae. Usually in the calf muscles, as elsewhere, there is one outstanding central lesion, but careful palpation will often establish the presence of disseminated, though small, focal overgrowths of connective tissue.

On the clinical side the affected muscles are weak, stiff, and painful, while nocturnal cramps are common and prolonged exercise irksome, if not impossible. In severe cases, too, there is a marked tendency to venous stagnation and hyperidrosis of the feet.

Where varicose veins co-exist the condition is, as a rule, aggravated, and not uncommonly complicated by villous arthritis of the knee.

Lastly, where the peroneal muscles become the seat of fibrositis, the morbid process may encroach or impinge on the sheath of the external branch of the sciatic trunk, and the pain therefrom radiates throughout the distribution of the peroneal nerve.

Norstrom, discussing this condition, is convinced that many cases of assumed sciatica of peroneal type are in reality secondary to lesions in the contiguous peroneal muscles.

To sum up, we see that the symptoms of gluteal or crural fibrositis may closely simulate those of genuine sciatica. But at the same time it must be borne in mind that the inflammatory process if unchecked may extend to the actual sheath of the nerve, in which case, of course, a true sciatic neuralgia may result. Moreover, apart from direct involvement of the sheath, a solitary nodule in the buttock, if it lie directly over or in contiguity to the nerve, may give rise to a sciatic neuralgia through pressure. In the same way a fibrositis primarily situated in the biceps, tendon, or peroneal muscles may originate that incomplete or partial type—peroneal sciatica. But the point we would lay stress on is that both in the gluteal and crural regions the primary mischief is in the muscular structures—in other words, that the condition is *myogenous* and not *neurogenous*.

In attempting to differentiate the spurious sciatic pains of gluteal or crural fibrositis from true sciatica, attention should be paid to the following points:—

1. The pain is referred not to the sciatic nerve, but to the muscular and fascial structures.
2. There is an absence of tenderness over the nerve trunk, and also of sensory paræsthesiæ, referred to its area of distribution.
3. The pain, too, differs from sciatica in that it is less radiating, partaking rather of a diffuse feeling of tenseness or stiffness referred more especially to the fibrous attachments of the affected muscles or aponeuroses.
4. The pain in uncomplicated gluteal fibrositis is less severe though more constant, and lacks, moreover, the tendency to paroxysmal exacerbation so typical of true sciatic neuralgia.

5. The pain in fibrositis is evoked or aggravated by the particular movement subserved by the affected muscle. Thus in the case of the *gluteus maximus* difficulty in rising from a sitting posture or walking upstairs, and in the *gluteus medius* internal rotation of the thigh, are the movements entailing most discomfort.

6. On the objective side nodules or infiltrations are to be detected in the implicated muscles or fasciæ.

DIAGNOSIS.—*A propos* of the detection of nodules it will not be out of place for us to refer briefly to certain sources of fallacy. The conditions most likely to be confounded with muscle indurations or nodules are localised muscular contractions, swollen glands, and varicose veins.

Localised Muscular Spasms.—These may be initiated through lack of the required delicacy in manipulating the affected muscle. But though induced by digital pressure they will also disappear again if the area be massaged gently, as a result of established tolerance on the part of the hypersensitive structures. Not only do muscle indurations appear and disappear in this manner, but they change their site from day to day. Moreover, they are not so sharply delimited as muscle indurations, and differ also in that they at no time lose their elasticity, while their surface is never uneven. On the other hand, muscle nodules are usually well defined, and sometimes of cartilaginous hardness, while they possess little or no resilience, and are in addition very sensitive to pressure.

Swollen Glands.—These are sometimes confused with muscle nodules, but the globular shape of the former should distinguish them from the flatter contour of the latter. Glandular swellings, too, are more movable and roll under the finger, while myositic deposits being an integral part of the muscle can only be moved along with it.

Varicose Veins.—Traversing the muscles as these do, they may also prove a source of error through misinterpretation of the painful muscular cramps that sometimes accompany them. Strauss advances a striking instance in which an induration the size of an apple in the soleus muscle proved on incision to be a mass of connective tissue in which was embedded a thrombosed varix the size of a cherry. The existence of such a formation could only be conjectured from the presence of other varices in the affected extremity.

In this connection, too, syphilitic gummata of the muscles.

also new growths, tuberculous masses, and calcareous trichinae have to be borne in mind, not to mention certain stages of myositis ossificans as well as the focal connective tissue hypertrophies that sometimes develop at the site of intramuscular injections of irritating solutions.

It need hardly be said that only by a careful and comprehensive examination of every case in all its aspects can such sources of confusion be excluded, but it can also be stated that in comparison with this every-day affection—muscular fibrositis—these are indeed most rare.

In conclusion, we would lay stress on the frequency with which gluteal fibrositis precedes sciatica, and on the fact that for weeks or months a patient may suffer from aching and dragging sensations in the buttock and thigh before a genuine sciatica ensues secondarily to extension of the morbid process to the nerve sheath. From the therapeutic point of view the recognition of the primarily myogenous character of the affection is of the highest importance. For if the true nature and site of the morbid process be recognised in its initial stages, then by the timely adoption of rest and massage we feel sure that the frequency of that troublesome and often obstinate affection—sciatica—would be appreciably diminished.

THE DOCTORS IN SOME RECENT FRENCH PLAYS.

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SINCE the days of Molière, or, further back still, from the times of La Basoche and *Les Enfants sans Souci*, when he was possibly a culture drift from Italy, the doctor has been a familiar figure on the French stage. The dramatists of France, more than those of any other nation, have loved to depict the life of the middle class. Their plays may be compared to genre pictures. Some of them are painted with that feeling for colour and that mastery of light and shade in which their fellow-countryman, Jean-Baptiste Chardin, excelled; others, though often true to life, are, it must be confessed, as vulgar in detail as pictures by Jan Steen and a few other artists of the Dutch school. In such dramas, dealing as they do with everyday life, it is natural that the doctor should appear, and it is as natural that his foibles should be held up to ridicule, and his virtues, if he has any, should be extolled.

We are told that plays and players "are the abstract and the

brief chronicles of time," and it is amusing "to see ourselves as others see us" on the stage, and especially on that of another country. Therefore, possibly, I may be pardoned if at this season, when some of us are fortunate enough to be able for a while to lay down the scalpel and put aside the microscope and test-tube, I obtrude a paper on such a frivolous subject among those which bear the hall-mark of learning and deep thought.

In one of the recent French plays a lady doctor makes her appearance, and as naturally the *bonne sens* is entitled to precedence I will introduce her first.

"Les Éclaireuses," a play by Maurice Donnay, was performed for the first time on the night of the 26th of January 1913 at the Comédie-Marigny, Paris. In addition to the fact that it was the opening of a new theatre, the event was interesting, because President Poincaré was among the audience, this being, I believe, his first non-official appearance in public after his election.

By the term "Éclaireuses" the author understands the leaders, the *avant-garde*, of those women who believe themselves in every way equal, if not superior, to men, and who have a profound contempt for their sisters who are content to live a humdrum life. They are suffragettes, but not militants, for they are far too conscious of their own mental ability to stoop to physical violence in order to win the battle.

The leading characters of the play are all lady doctors, lady barristers, lady novelists, poetesses, *et ad genus omne*. In addition, there are a few commonplace women thrown in to act as foils to the others, and, of course, there are a few mere men. Into this motley assemblage enters Cupid—Cupid *à la française*, be it well understood—and gives the dramatist his opportunity.

The lady doctor who figures in the play is a certain Rose Bernard. She practises homeopathy, and her favourite drugs are aconite and belladonna. Naturally, she is very clever and has a large *clientèle*.

One of her patients is the heroine, Jeanne Dureille, a neurotic sort of individual, who suffers from insomnia and from nervous fancies, which she describes as insupportable obsessions. Sometimes she imagines, and she cannot, do what she will, get rid of the idea, that she is opening a penknife which breaks her nails, or that she is writing with a pen that scratches and bleeds, or again that she bites her tongue in licking an envelope. She appears also to have hallucinations of sight, though it may be that she merely

misinterprets the visual symptoms of megrim. Finally, she complains that occasionally her hands seem to be paralysed, and that she cannot close her fingers.

Dr. Rose Bernard, who is evidently a follower of one of the modern German schools of medical psychology, explains all these psychasthenic symptoms as being due to suppressed sexual impulses, in which she is possibly right, seeing that the patient is about thirty years old, an age at which erotic eccentricities are not uncommon among celibates.

Jeanne Dureille, however, does not agree with the diagnosis. She protests with some little show of anger that she is not an hysterical person, and she takes exception to the nature of some of the doctor's questions.

But Dr. Rose Bernard replies brusquely: "I could understand that you might be annoyed before a doctor, before a man, but before me! If women practise medicine, it is because they believe that they are better acquainted with the physiology and psychology of their suffering sisters; that, at least, is my theory, my principle, my point of view. You describe to me some little miseries of imagination. I look for the cause of them, that is all."

It is unnecessary to give a further account of the play, which, though an amusing study of a phase of modern life, has no further special interest from a medical point of view.

Let us turn to a little drama which concerns itself altogether with sick folk and doctors. This is "*La Gloire Ambulancière*," a comedy in one act by Tristan Bernard, which was performed for the first time at the Comédie des Champs-Élysées on the 10th of May 1913. It is nothing more than a curtain raiser, but it is a delightful piece of foolery from start to finish, and the author seems to have caught something of the spirit of Molière in describing the doctors and the friends of the patient. There are ten characters in this short play, and each is a miniature painted by a master hand, but there is no sign of labour, for Tristan Bernard's genius is of that high order that it conceals itself.

The farce is a story of much ado about nothing, or less than nothing. The patient's symptoms appear to have been very acute, but the history and the subsequent course of the case lead one to suppose that the administration of a brisk cathartic would have put things right at once. Unfortunately for his reputation, the very simplicity of the case seems to have misled

Dr. Lehasquet, the first practitioner who was called in. He thought that the patient was suffering from appendicitis, but at the same time he was not quite sure, and he ran over in his mind the symptoms of all the other acute diseases of the abdomen that he could remember.

The physician's manner does not seem to have given the patient's husband much confidence in his ability. The good man began to fidget. At last he said: "Doctor, we have perfect confidence in you"—how familiar that phrase sounds! "We have perfect confidence in you, but we wish to tranquillise the family."

"Very willingly," replied Dr. Lehasquet. "Fetch whom you like for a consultation."

"But, Doctor, it is for you to indicate the person whose advice you would wish."

Accordingly it was arranged that the celebrated Dr. Herchet should be called in.

Meanwhile various members of the family have begun to assemble in an adjoining apartment. They all swear by their own family doctors, and criticise in no measured terms the unfortunate medical man who is actually in charge of the case.

The patient's mother-in-law, a woman of vast experience in disease, as most mothers-in-law are, plainly calls him an ass.

"My doctor," she continues, "is an extraordinary man. He gets up at four o'clock in the morning. The books on his study table are so high"—raising her hand as far as she can reach. "He is very learned, but he never stops studying. But as for this little Lehasquet, he knows nothing at all."

"I would not let him attend my dog," says the aunt of the patient. "I have often begged them to call in my doctor. He is a most valuable man. He diets you. He never gives drugs. He is no quack. As for Lehasquet, it is well known that he only passed his examinations by the connivance of his examiners, and that he had the thesis for his doctorate written for him by some poor devil in the Quartier Latin."

If we, humble practitioners of medicine, should ever venture to cultivate a little professional vanity, it would soon be nipped in the bud by the gossip of our patients' friends. And is it not singular how sure such gossip is to filter round to our ears?

Even the consultant, the great Dr. Herchet himself, comes in for a share of the unfriendly criticism. The patient's aunt is so

amoyed at hearing that he is to be called in—a friend of hers heard of him making a terrible blunder once—that she is about to go off in a huff. At this the husband becomes irritated. He says that Dr. Herchet has been recommended to him as the leading specialist in the disease from which his wife is supposed to be suffering, and that he cannot allow her health, and perhaps her life, to be jeopardised because of a miserable question of *amour propre*.

However, the aunt, probably from financial reasons, is an important member of the family, and the mother-in-law steps in and smooths matters over.

While they are waiting for the arrival of the consultant, Dr. Lehasquet enters from the sickroom. The scene that follows is perhaps the best in the play. All the women crowd round the doctor, first deafening him with questions about the invalid, and then describing to him their own pet ailments. One suffers from rheumatism in her right leg, for which she has been recommended salicylate. Is salicylate good for such a complaint? Another is troubled with a nervous tickling in her throat, for which she has been advised to try menthol gargles. Does Dr. Lehasquet approve of menthol gargles? A third is afflicted with nettle-rash whenever she eats fish. Could Dr. Lehasquet recommend some preventative medicine which she might take before a meal, and so be allowed to enjoy a favourite dish with impunity?

Had Dr. Lehasquet shown as much adroitness in dealing with a patient whose case he did not quite understand, as he did in extricating himself from this crowd of gossips, he would have been a more successful practitioner. As it is, without committing himself to any of the proposed lines of treatment for the complaints about which he has been so suddenly consulted, he makes his escape under the pretence that he requires to make use of the telephone, which is in the next room.

"He knows nothing at all," exclaims the mother-in-law, as soon as the door has closed behind the doctor.

"Yes, he does," remarks the sister-in-law of the patient, "but he does not wish to say anything. He won't give a consultation for nothing, not he."

"However, they are the only ones he has the opportunity of giving," observed the aunt with a sneer.

Dr. Herchet, the eminent specialist, arrives. Although he is fully conscious of his own importance, the great man's manners

are very affable. He is condescending to all the friends of the sick woman, and he is particularly interested in a poor relation whose name happens to be the same as that of a certain important political personage. But when he finds out that the individual is only a tradesman who sells feathers for ladies' hats, and is no relation of the minister, he can scarcely conceal his disgust, and abruptly turns his back upon the little man.

The simplicity of the case deceives the consultant as well as the family doctor. After examining the patient, Dr. Herschel pronounces for an operation with the least possible delay. But while the two medical men are in another room consulting together, news is brought to them that Nature has come to the assistance of the sick woman and wrought a complete and immediate cure.

On the same night, and at the same theatre where "La Gloire Ambulancière" was performed, a three-act play by Edmond Fleg, entitled "Le Trouble-Fête," was put on the stage. In this comedy a family doctor also appears. If he had practised in England sixty or seventy years ago, the brass plate on his front door would probably have been engraved with the titles "Surgeon and Accoucheur." But we are above that sort of thing now. This doctor is an easy-going, amiable man, and his patients have such perfect confidence in him that they listen to all he has to say, and go away and do exactly the opposite.

It would seem that Tristan Bernard is fond of doctors, for in a play entitled "Les Deux Canards," which was written by him in collaboration with Alfred Athis, and was performed for the first time on the 3rd of December 1913 at the Théâtre du Palais-Royal, a medical man is again found among the *dramatis personæ*. The piece is broad farce, and is crammed full of absurdities. Nobody is taken seriously, not even the doctor.

Valmoutiers, the country town in which the drama takes place, is so small that it can only support two medical men, and we are told that one of them is himself always ill. Indeed, it is a matter of common knowledge that he is his colleague's best patient.

A duel is about to be fought, and the surgeon, the one who enjoys good health, is called away from the bedside of his brother medico to be present at the combat, in case his services should be required. The doctor has never acted in such a capacity before, and he has not the least idea what may be needed. So, not

wishing to be unprepared, he arrives on the ground with dressings and surgical instruments enough to render first aid to a regiment of wounded.

Nowadays, at duels, as at all other public functions, it is necessary to have a photographer and a cinematograph apparatus in attendance. On this occasion the photographer worries the doctor a good deal. He explains that if one of the combatants is wounded, the surgeon must be very careful not to get between the camera and the injured man, and especially that in making his examination and in applying the dressings he must not allow his hands to conceal the injury, or he will certainly spoil the film.

"But it will be impossible to dress a wound under such conditions!" exclaims the doctor.

"Oh, yes," replies the photographer contemptuously, "it is easy enough. At any rate, it is easy enough for others. All the leading surgeons operate so when they are in front of a camera."

In the end, to the doctor's great relief, the duel does not come off, but honour is satisfied.

Another play of the same type, the *comédie-bouffe*, "*Ma Tante d'Honfleur*," by Paul Gavault, was performed at the Théâtre des Variétés on the 20th of March 1914.

This comedy consists of a series of comic situations strung together on an impossible plot, and without much regard to the unities. The first scene is laid in Paris, and there is a strong flavour of Bohemia about it, but it is the Bohemia of to-day, in which there is none of the delicacy of sentiment which Murger knew so well how to instil into his stories of the old Quartier Latin. Then the scene changes to the country, and the fun of the thing depends on the increasing absurdity of the situations.

In such a play the characters are, of course, caricatures, but in all caricatures, even in the most broadly drawn, there are always some strokes which are true to the original, and this is the case with the personages in this play, in spite of all their absurdity.

One of the minor characters is a certain Doctor Douce—he is very particular about his name, and spells it letter by letter to his patients, so that they may lose none of its sweetness. He practises medicine in the town of Brive-la-Gailliarde, a town of about 20,000 inhabitants and a sous-préfecture, in Corrèze. He

is a devotee of "bridge," and he is terribly severe on the shortcomings of those who chance to be his partners in the game. In one scene in the play his joy is subdued, but very real, when he finds that the fee which he has received from an unexpected patient will just cover his losses in the last game—losses which it must be understood, were entirely due to the stupidity of his partner. Caricature it may be, but one cannot help thinking that one has met the original of Dr. Douce in real life.

Perhaps the most charming portrait of a medical practitioner that modern French dramatists have presented us with is Dr. Pinbrache. He is a dear old man, and has practised all his life at Chantelouve, a pretty village on the borders of the Périgord and the Limousin. He is introduced to us in the second act of "*La Belle Aventure*," a comedy which we owe to the collaboration of G. A. de Caillavet, Robert de Flers, and Étienne Rey, and which was performed at the Théâtre du Vaudeville on the 23rd of December last year.

As is natural with a village practitioner, Dr. Pinbrache is loved by his patients, high and low.

He meets a countrywoman, and asks after her little grandchild.

"I was afraid," says the doctor, "that she was going in for appendicitis." (This complaint appears to have been very prevalent just then behind the footlights.)

"Oh, no, monsieur le docteur," replied the old peasant. "You flatter us. But, look you, we have not the means to afford these diseases. We are not rich enough."

A little later he comes across one of his wealthy patients, Madame de Trevillac, an old lady, who has just made a long and fatiguing journey.

"My dear friend," he says, "this journey is madness. A week ago you could not walk round your fruit garden. Whatever can have given you such strength?"

"It was not your poisons, you may be sure," replies the sarcastic old dame. "When I awoke this morning and remembered that my little Hélène was to be married to-day, I took your medicine——"

"Ah!" exclaims the doctor, well pleased and expecting a compliment.

"—— and I threw it out of the window," continues Madame Trevillac.

Dr. Pinbrache, too, has a caustic philosophy of his own.

"I have remarked," he says on one occasion, "that inheriting property brings with it two advantages. First, one inherits the property, and then one quarrels with the rest of one's family."

These are a few specimens of the doctors which we meet with on the modern French stage. One might find many others, for the playwrights on the other side of the Channel are exceedingly prolific, and, as I have said above, they are very fond of including the medical practitioner in their *dramatis personæ*.

In conclusion, may I be allowed to refer for a moment to a play which was performed in November 1912 at the Théâtre de la Porte Saint-Martin? This is Henry Bataille's "*Les Flambeaux*," one of the finest pieces which have been put on any stage, English or Continental, for some years. Bataille is a great poet as well as a dramatist, and his play abounds with beautiful passages, while as a study in psychology it is worthy of attention. But from our present point of view its special interest lies in the fact that, for the first time, I believe, in the history of the drama, the biologist figures on the stage.

Laurent Bouguet, the principal character in the play, is the *Directeur* of the *Institut Claude-Bernard*. He has won his world-wide renown by bacteriological research, and a short time before the opening of the story, in collaboration with his wife and his principal assistant, he has discovered the cancer bacillus, though he has not as yet announced his discovery to the world.

The other characters are professors, surgeons, students, both male and female, and laboratory assistants. The staging of the play is in keeping. One sees large and well-lighted laboratories. Everything speaks of scientific research. There are microscopes and other biological instruments placed on spotless tables, and the shelves are laden with bottles of reagents. During pauses in the dialogue one hears the clink of steel on glass, and by an olfactory hallucination one fancies that one smells the faintly acrid odour of chemicals.

The first scene represents Laurent Bouguet's private laboratory in the *Institut Claude-Bernard*, and is said to be an exact reproduction in all its details of that of Professor Metchnikoff in the Pasteur Institute.

Throughout the play one breathes, if one may so express one's self, an atmosphere of bacteriological research. One cannot get away from it. Even in the second act, which is the richest in dramatic situations, and which takes place in the beautiful gardens of the Institute, it is the same. However much one is taken up

with the love tragedy, some of the details of which would be sordid enough were they not touched by the glamour of Bataille's genius, which is the plot of the drama, one hears always, like a chorus or refrain, the story of the discovery of the bacillus, and the loudly-expressed hope that the serum, which is to relieve the world of one of its greatest scourges, will soon be found.

The series of modern plays which have been referred to in this paper, although they may have sounded all the others in the gamut, end on the same note as that on which they began. In Maurice Donnay's "*Les Éclairées*" there runs an undertone that tells us that home, home life, the chaste and honourable *vie à deux*, is the true state of earthly happiness, and in "*Les Flambeaux*" Bataille shows how infidelity to the marriage vow may cause the most gifted of men, even a torch-bearer who heads the victorious march of science, to fall from sin to sin until at last his honour and his life are lost in a miserable catastrophe.

Certain superficial writers, and still more superficial speakers, say that the French have no idea of home. Have they not? Listen! It is one of the characters in "*Les Flambeaux*" who is speaking. He is describing what he is looking forward to after he is married to the girl he loves. It is almost impossible to translate the words; to do so would be to rob the violet of its perfume.

"Oui, quelquefois, j'ai songé à la femme comme un bouquet dans une maison, une chose parfumée, très douce. Un petit bout sous la lampe—qui cause, qui brode, qui vous apporte un peu sa gaieté du matin, de la journée."

A MEDICO-LEGAL PROBLEM: THE VISUAL CONDITIONS NECESSARY FOR SHOOTING.

REMARKS UPON A REPORT MADE BY PROFESSOR FRENKEL.

By WILLIAM GEORGE SYM, M.D.

THE opinion of Professor Henri Frenkel (Toulouse) was requested in the following unusual case. As he says, reports such as are given here do not often find their way into medical journals. A brief account of this case may, partly on that account, prove interesting and useful to readers.

During the night of 5th-6th December, M. P. was hastily summoned from sleep in an upstairs room by a great knocking

on the door of his house, the electric bell being at the same time persistently sounded. M. P. leaped from bed and rushed to the window without waiting to dress. Opening the window, he perceived a young man standing by the door, who inquired of him if he had "got the sack." "What sack?" asked M. P., when an outburst of laughter from some more lads whom he had not yet seen told him that he had been made the subject of a practical joke. M. P., not perceiving the fun of this sort of thing, vigorously cursed the students (for such the youths were), who naturally enough replied with chaff; but so enraged did he become that he re-entered his room, opened a drawer in his dressing-table, took from it a loaded revolver, and returning to the window ordered the lads to "Go away, or I fire." They went, but not sufficiently rapidly to please M. P., whom they continued to rally. In a fury he then fired his revolver three times, a proceeding which had the effect of quickening the steps of his tormentors. But one poor boy (19)—the one who had spoken first, and who was behind the others and at about 40 yards distant—cried out that he was wounded; a stream of blood poured from his mouth, and he died almost immediately. Autopsy disclosed that one of the bullets had traversed his right lung, dividing in its passage a branch of the pulmonary artery, fracturing two ribs, and injuring one of the vertebræ. Another of the students had his coat sleeve pierced by another ball.

In spite of subsequent denials, it was proved by the servants that M. P. had at the moment believed that one of his shots had struck someone; he was in a state of great agitation and excitement, but for all that he carefully cleaned his five-chambered revolver (9 mm.), removing and destroying the three spent cartridges.

The two undischarged cartridges were handed to the servants to put away, and from them the police obtained them.

The act of M. P., even apart from its terrible and unforeseen consequences, seemed violent out of proportion to the provocation received, and could only be explained, as the "accusation" states, by some morbid condition (such as that from which he was known to suffer), which had caused his temper to become violent and irascible to a degree. He possibly had no actual intention to do more than fire in the air, so as to alarm and disperse his tormentors, and possibly the pathological condition affecting the joints of his right hand, and his great defect of vision, had caused him involuntarily to bring the pistol to bear upon the

unlucky youth. Unfortunately, however, at his first examination M. P. had admitted firing not in the air but in the direction of the young men, and was unable to explain away this admission, but there was no evidence that he had any intention to kill. M. P. had retired about a dozen years previously, on grounds of health, from his business as an engineer's draughtsman; he lived alone, and had a clean record.

Dr. Castan, who was directed by the *jury d'instruction* to report upon the mental condition of the accused, described him as a neurasthenic, a neurotic, with total want of self-command, a prey to extreme irritability and to violent pains in the head, his vision very bad, his bladder giving trouble, his right hand so affected that he was incapable of giving proper direction to a pistol. His mental capacity was, however, quite good, and his memory exact, and thus his responsibility must be admitted, even though it might be considered to be lowered in degree.

The prisoner was examined as to his visual condition by H. Frenkel (Toulouse), who found him to have a slight degree of ptosis (left) with divergence, but with no evidence of any paralysis of muscles (save for the ptosis). Double vision was not present, for the left eye was very amblyopic, and though there was a history of cured convergent strabismus, Frenkel considered it very much more probable that this divergence was due to the amblyopia than that it had taken origin in a secondary contracture of the paretic external rectus. As regards the pupils, that of the right eye was found to be very small, though hardly "mêlée," and to be immobile both to direct and to consensual reaction, though accommodation brought a quick response (Argyll Robertson pupil). Vision of the right eye was $\frac{1}{2}$ unaided, $\frac{7}{8}$ on use of a -0.5 D. spherical lens; the left eye had no field save above where there was ability to make out hand movements. Color vision, even with the right eye, was also very defective. On examination with the ophthalmoscope there was found to exist a condition of white atrophy of the optic nerves, this being decidedly more pronounced in the left eye. Frenkel requested that in view of these three pathological conditions (Argyll Robertson pupil, ptosis not completely cured, and optic atrophy) the prisoner's general nervous system should be thoroughly investigated.

Meantime, the interesting question presented itself—Did the prisoner really see the deceased? Assuming in the first instance that there had been good daylight, that the distance was 20 m.,

and that the height of the deceased was 1.60 m., the fraction $\frac{1.60}{3.000}$ indicates the acuteness of vision required for the deceased to be perceived. As the fraction $\frac{7}{3000}$ expresses the height of the test letters and the distance at which they can be seen when vision is full, it follows that $\frac{1.60}{3.000} \div \frac{7}{3000}$, viz. '38, equals the number of times the vision may be more feeble than 1, and yet have enabled the deceased to be perceived at 30 m. But since the prisoner enjoyed but $\frac{1}{6}$ of vision (without correction), $\frac{1}{6}$, viz. $6\frac{1}{6}$, expresses the number of times the vision might be more feeble than it was if the figure was to be perceived *under daylight illumination*. Further, if we deal with the human figure much as we do with the test letters, and regard it as possessing width equal to one-fifth of its height, then to distinguish point from point that number should be multiplied by 5, when we obtain $31\frac{2}{3}$ as the number of times that vision might have been worse than it was, and yet the figure be in some sort recognised; but it is plain that even in broad daylight the acuteness of vision required to see accurately the details of the human figure at the distance between prisoner and victim is many times that possessed by the accused. By a similar process of reasoning, into the details of which it is not needful to enter, Frenkel concludes that even in good daylight the acuteness of vision required to see the "sight" of the weapon employed was superior to that possessed by the accused.

But further, the tragedy occurred at night, when the only illumination which there was came from a paltry gas jet on the other side of the street. Whatever effect this might have had upon the visibility of the deceased, it would have little or none upon that of the "sight" of the weapon. Yet again, the prisoner was, as a matter of fact, the subject of optic atrophy, and must therefore, says Frenkel (though this statement is open to question), have been to a large extent deprived of his adaptation to feeble illumination, and thus must have undergone greater lowering of visual acuteness than would a normal person. Examination of the "luminous acuteness" of the prisoner with Foerster's photometer showed that his capacity was to that of another individual (normal) as 1 to $9\frac{1}{2}$. It is, however, to be remarked that such an investigation is a subjective one, and that the prisoner's statements should hardly be expected to be of a kind which would tend to make his position worse than it actually was. So far as that examination went, however, it tended to confirm with greater certainty the fact that while he might have seen the deceased

in a very indistinct fashion, he could not possibly have seen the sights of the weapon.

After an eloquent appeal on his behalf by his counsel, who dwelt carefully and skilfully upon his morbid physical condition, the accused was acquitted and liberated. That the maximum penalty should not be exacted was to be expected, but the complete acquittal is rather astonishing, for there was no question that the prisoner, irritated at being disturbed by these midnight revellers, abused them roundly, and then went into another room, opened a drawer, took thence a revolver, returned to the front room, spoke with them again, and then, but not till then, when he had had time to have recovered some of his self-possession, fired at them. That he fired *at* them there seems no reasonable possibility of doubt, for two of the three shots reached them, the coat sleeve of another of the revellers than the deceased having been hit by the bullet. The accused had at first examination admitted firing in their direction too, not merely in the air, and whether he could distinguish the sights of the weapon was entirely beside the question. Besides, has not many a man been shot by another who held his pistol in his pocket all the time, firing it through the cloth? Nay, if a blind man seized a pistol and fired three shots in the direction of his audible tormentors, of which two struck, to plead that he did not see the sights of his weapon would be a feeble defence. Aiming, as was pointed out by Berry in a paper in this *Journal* (August 1912), is a more subtle matter than merely one of looking along a line.

A further point to be remarked upon is that certain of the calculations entered into in Frenkel's report illustrate the mistake which is very apt to be made by the erroneous manipulation of the expression of the visual acuteness as a vulgar fraction, and by dealing with it as a purely mathematical symbol. The expression $\frac{1}{30}$ is, with all deference to M. Frenkel, not the same thing as $\frac{1}{3}$, and he has no right to use it in a calculation as though it were. The mistake has crept into all too frequent use of late years.

CLINICAL RECORDS.

FURTHER NOTE ON A CASE OF DYSPIUITARISM.

By A. W. FALCONER, M.D., M.R.C.P.(Lond.).

IN December 1913 I published in this *Journal*¹ an account of a case of dyspituitarism, the essential features of which were as follows:—

Female, aged 16½, height 53 ins., weight 3 st. 4 lb. The patient gave a history of an attack of diabetes insipidus lasting six weeks, some four months before she first came under observation. When first seen she was markedly under-developed and very emaciated. There was complete sexual infantilism. There was double simple optic atrophy and complete left homonymous hemianopia. The sella turcica was perched on a solid sphenoidal base, and on the photographic plate was only 6 mm. in its antero-posterior diameter. The carbohydrate tolerance was markedly reduced, 25 grms. of glucose producing free glycosuria. The Wassermann reaction was strongly positive; and the patient's mother presented a healed perforation of the soft palate.

It was held that although it was impossible to tell whether the interpeduncular tumour was primarily of hypophyseal origin or the result of a syphilitic process, the general symptoms could only be referred to a disturbance of the functions of the pituitary gland.

The case, however, presented a striking contrast to the usual adiposo-genital dystrophy of Fröhlich in the presence of marked emaciation and a decidedly diminished carbohydrate tolerance, in place of the usual adiposity and greatly increased carbohydrate tolerance. The dwarfism and sexual infantilism were considered to be due to a deficiency of the pars anterior, and it was suggested that the emaciation and diminished carbohydrate tolerance depended on a functional overactivity of the posterior lobe.

The patient intermittently attended the out-patient department, and has been treated irregularly with hydrarg. c creta and pituitary tablets (B. W. & Co.'s) of the whole gland.

She has had no further complaints, but her general symptoms have markedly changed. She has progressively put on weight, until she is now notably adipose. When first seen in March 1913 her height was 53 ins. and her weight 3 st. 4 lb. In June 1914, when 18 years of age, her height was 53½ ins. and her



FIG. 1.



FIG. 2.

weight 5 st. 10 lb. She is still, sexually, completely infantile. There is no trace of pubic or axillary hair. Her carbohydrate tolerance, which was previously below 25 grms. of glucose, has increased, and 200 grms. of glucose does not now produce glycosuria. I have been unable to get her to take larger amounts of glucose, as it makes her feel sick.

Fig. 1 is a photograph taken in March 1913: Fig. 2 one taken in April 1914. Since the second photograph was taken the patient has put on a further seven pounds in weight. The sella turcica appears slightly larger than on the first examination, but is still notably small.

The case is now a typical example of Fröhlich's syndrome occurring in a syphilitic, and it is suggested that the initial functional overactivity of the posterior lobe has now passed into the more usual condition of diminished functional activity.

Cases of pituitary disease associated with emaciation have been recorded by Cushing² and others, but in none of the cases has it been possible to estimate the carbohydrate tolerance. Cushing, in commenting on these cases, refers to the contrast they present to the Fröhlich type, but considers that probably all cases of hypophyseal infantilism will eventually be grouped together whether they exhibit adiposity or not. In his own case he attributed the sexual and corporeal infantilism to a functional deficiency of the pars anterior, and states that it is "barely possible that there may not have been a comparable degree of posterior lobe implication."

In view, however, of the exact parallelism between the state of nutrition and the carbohydrate tolerance in the present case, it would seem a justifiable assumption that the unusual emaciation was the direct result of a functional overactivity of the posterior lobe of the pituitary gland.

REFERENCES.—¹ Falconer, A. W., *Edin. Med. Journ.*, December 1913, p. 487.

² Cushing, *The Pituitary Body and its Disorders*, 1912, p. 45.

CÆSAREAN SECTION IN A PRIMIPARA WITH OVARIAN CYST.

By PATRICK LEIGHTON, M.D., Ch.B.

THE interest of the following case lies in the remarkable vitality that a woman shows during and after labour.

A. P., age 25, had been in labour 12 hours when I was called to see her at 10 A.M. The pains were strong and regular; the os admitted 2 fingers; presentation L.O.A. In the evening there was not much headway; the pains were

strong; the woman was tired; pulse, 100. At 10 p.m. I was called to another case, and asked my partner, Dr. Sandford Smith, to visit A. P. At midnight I was told that A. P. had a pulse of 126, and was in a bad way. Accordingly, at 12.30 a.m. I dilated the os under chloroform, and then found the pelvis was very small justo minor; there was also a well-marked Bandl's ring. The uterus was firmly contracted, and there were no forewaters. Forceps proved useless; one blade went in easily, but the other could not be applied. We then both tried turning, without success, as a hand was all that we could get hold of, the uterus being in a state of tetanic contraction. All these manipulations were carried out under deep anaesthesia. Cesarean section seemed the only resource, so at 3.30 a.m. the patient was removed to hospital by motor. On the operating table her pulse was 130, and the uterus firmly contracted. Dr. Sandford Smith gave her chloroform and ether, followed by open ether, while I opened the abdomen by a large incision, and got the uterus outside resting on a towel. On incising the uterus the placenta presented and was quickly peeled off and removed. The infant was a large one, and was rapidly extracted. There was no liquor amnii. The bleeding was not alarming, and we stitched up the uterus with thick catgut. We then found a large ovarian cyst on the left side partially distended with fluid. This was removed in the usual way, but a good deal of time was wasted owing to troublesome bleeding from the pedicle, the veins everywhere being enormously engorged. This was eventually controlled by under-sewing with a curved intestinal needle. The abdomen was closed with through-and-through sutures to save time. Unfortunately the infant was dead. It is possible that if there had been someone to attend to it it might have survived, but we were short-handed. The mother's condition was better after than before the operation; her pulse was slower and fuller. She was put to bed in the Fowler position, with a continuous rectal saline. We did not expect a smooth convalescence after all the intra-uterine interference. On the 4th day she had a rigor, and the temperature ran up to 103° F.; 10 c.c. of *B. coli* serum was given. On the 5th day another rigor followed; 10 more c.c. were given. There was much pain and distension. The patient looked very ill, was sick, and took her food under protest. The temperature for 14 days was 99 to 101° F., pulse 120 to 130. On the 10th day pus poured out of the lower angle of the wound along with numerous catgut ligatures. There was an offensive vaginal discharge, with pieces of membrane, showing that the uterus had not been properly cleaned out at the time of operation. The discharge of pus gave much relief, and the woman began to mend. I kept in the abdominal sutures 18 days, as I feared the whole wound would give way. In 25 days the wound had healed, and she was carried into the garden. I kept her in hospital another 3 weeks as she had no one at home to look after her. If her condition at the time of operation had not been so desperate I would have removed the tubes to prevent conception, but prolonging the operation was not justifiable.

The points of interest about the case are—

1. The patient's remarkable tenacity of life: only the skilled nursing she received saved her when she developed septic pelvic peritonitis.
2. The early occurrence of Bandl's ring.
3. The ease and simplicity of Cesarean section as an operation compared with ovariectomy when there are adhesions.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

W. T. RITCHIE, M.D., EDWIN MATTHEW, M.D., AND
J. D. COMRIE, M.D.

LATE RICKETS.

RICKETS occurring at an age after childhood is not very rare, but its nature is even more obscure than that of the ordinary form of the disease. Wieland's paper on "*Rachitis tarda*" (*Arch. d. Intern. Med. u. Kinderheilk.*, Bd. xiii. 1914), which covers the literature of the subject very fully, is therefore a welcome contribution.

Trousseau recognised the fact that rickets might occur after childhood, and regarded it as identical with osteomalacia: the same process affecting growing bones caused rickets, affecting fully-grown bones, osteomalacia. Virchow, on the other hand, held that the two diseases—rickets and osteomalacia—were different, and under the influence of his opinion it became customary to describe all cases of bending of the bones in children as rickets, in adults as osteomalacia. The difficulty arose, however, in connection with the cases closely resembling rickets but occurring in adolescence and the cases resembling osteomalacia occurring in infancy, and to meet this difficulty the term *osteomalacic-rickets* was sometimes used.

One of the first to contest the teaching of Virchow was Ollier, who described *rachitisme tardif*, or rachitis adolescentium, in individuals some of whom had, and others of whom had not, suffered from rickets in childhood: and after him Mikulicz proved that certain local affections of bones—*e.g.* knock-knee—which had previously been looked on as purely mechanical in origin, were really rickety. In 1895 Deydier introduced a practically useful classification of cases of late rickets—(a) generalised, which is rare: (b) local, which is not uncommon. Mikulicz's observations attracted less attention than they deserved, because, although he showed that the ordinary genu valgum of young adults was not a static deformity, but was essentially rachitic, the condition in question was one which had not much interest, except for orthopaedic surgeons. This failure of Mikulicz's work to evoke notice is the more remarkable, because he pointed out that in well marked cases it was almost always possible to detect other signs of rickets, such as a rosary, or enlargement of the epiphyses at the wrist and ankle. He must be credited with being one of the first to appreciate the fact that in these cases of "localised" rickets the prominent lesion was only a part of a much more widely-spread affection. This fact was firmly established by Schmorl in 1905. He examined microscopically

the skeletons of four patients (3 cases of genu valgum and one case of kypho-scoliosis) in whom, apart from the local deformity, there was neither clinical nor macroscopic evidence of rickets. In all of these he found throughout the skeleton microscopic signs of rickets—uncalcified osteoid tissue, and characteristic changes in the epiphyseal cartilages. According to Schmorl's findings, the changes in the epiphyseal cartilages are not present in older persons (they were most marked in his youngest case), whereas the development of uncalcified osteoid tissue in the bones occurs at all ages. He therefore argues that marked swelling of the epiphyses is only to be expected in the younger patients with late rickets—patients in whom the growth of the bones is still active. The characteristic rickety change in the bones, for Schmorl, is increased osteoid tissue, *i.e.* abnormally broad layers of uncalcified tissue, filled with osteoblasts, covering all the endochondral and periosteal trabeculae. Finally, Schmorl ranges himself with those who believe that this process is identical with osteomalacia: he reverts to Trousseau's doctrine, and parts from the Virchow school, who would distinguish the osteoid tissue of osteomalacia as old bone decalcified, from that of rickets as new bone laid down without lime in it. In short, late rickets is to be looked upon as the link between rickets of childhood and osteomalacia of adults.

A. Severe or Generalised Late Rickets. — In 1907 Looser carefully studied a case of this kind. The patient was a male, 27 years old, an imbecile. His development was slow: he could never walk or stand. Dentition was late. He sustained numerous fractures from his 13th year onwards. The epiphyses were enlarged, and his bones were bent. The bones of a leg which required to be amputated showed the osteoid changes in the diaphyses referred to above, and marked broadening of the epiphyseal cartilages. The bones were atrophic to a degree not found in infantile rickets; there was also evidence of heightened excitability of the reflexes. This case, then (and many others like it have been reported), illustrates the co-existence of the changes characteristic of rickets and of osteomalacia. In Looser's opinion "rickets and osteomalacia are identical: they may occur at any age, but are specially prone to develop during the first and second periods of greatest growth. Their clinical and anatomical features are modified by the age at which they occur."

Of the cases of this type reported, some have a history of rickets in infancy, followed by more or less recovery, and then relapse into a progressive condition of osteomalacia with recurring fractures. These we may call *inherited rickets*, without, however, attempting to separate them from the cases in which there is no particular evidence of early rickets.

According to Tobler, who examined a series of patients with late rickets, varying in age from 14 to 20 years, the symptoms are

remarkably uniform. Pain on walking or standing, tiredness, pains in the bones, are invariably complained of; the gait becomes unsteady or waddling; curvatures develop. The signs of the disease are manifest. Rickety rosary, swelling of the epiphyses of hands and feet, and deformation of the legs were constant. In a few cases curvature of the spine, clavicles, or ribs occurred. The "line" was not affected. The muscles are hypotonic, and retardation of growth is always present. As occasional symptoms, delayed sexual development, infantilism, amenorrhœa, stiffness of the joints from muscular hypertonus, clubbed fingers, tetany, anemia with lymphocytosis, and dwarfing with adiposity, have been described.

Radiographs of cases with epiphyseal enlargement show the usual broadening and irregularity of the epiphyseal cartilage. The bones give evidence of osteoporosis—general transparency, wide marrow space, rarefaction of the trabeculae, and thinned or absent cortical layer. The only other condition which shows such widespread osteoporosis is *fragilitas ossium* or *osteopsathyrosis*, old-standing cases of which have often been reported as late rickets. It is distinguished, however, by the brittleness of the bones without softening, by its hereditary or family occurrence in many cases, while histologically there is no development of osteoid tissue. *Osteopsathyrosis* has closer relations with *osteogenesis imperfecta*, a congenital, sporadic (not familial) condition in which intra- and extra-uterine fractures occur, associated with defective periosteal ossification and extensive craniotabes. It is not certain whether the two forms of fragility of the bones are identical or even allied to one another. In any case, neither has any connection with true late rickets or *osteomalacia*.

B. Slight, Localised Form of So-called Late Rickets.—This usually affects adolescents from the 10th to the 20th year. These individuals often hold themselves badly, and complain of pain in the legs and feet. The chief skeletal alterations are kyphotic and scoliotic curvature of the spine, genu valgum, pes valgus, and coxa vara. Marfan has lately drawn attention to a swelling of the sternal end of the clavicle with subluxation of the sterno-clavicular articulation as a sign of localised late rickets. In all these cases the ordinary signs of florid rickets—in the pelvis, chest, or epiphyses—are absent. They constitute what has been known for years as the idiopathic (postural) deformities of the growing period of life, and the name describes their clinical features well enough, and they used to be regarded as primarily due to atony of the muscles and ligaments, with, perhaps, in addition, some essential feebleness of the bones. The observations of Mikulicz and Schmorl, however, show that they are really rachitic in origin. It is not unlikely that in many cases these changes develop, not because of the occurrence of actual florid rickets in later youth, but on the basis of an old healed rickets of infancy, which has left some slight alterations

in the bones—these, however, not becoming apparent until the stresses of the second part of growth have to be borne. The question has still to be answered, however—Is there in addition to these rickety deformities of late childhood and youth a true localised florid late rickets? Wieland thinks that it is impossible to say definitely; his conclusion is that these essential deformities of the growing period have a complex etiology. In addition to florid rickets, there must in most cases be other causes—adaptations of growth to old rickety or congenital deformity of the bones, adaptations of the skeleton to faulty attitudes caused by slack musculature. However highly we may estimate the rôle of rickets in causing these deformities, we should hesitate to speak of late rickets in this connection, but would rather limit the term to the generalised florid type of the disease.

It is commonly held that rickets of infancy may heal without leaving a trace of its existence. This Wieland denies. He thinks that a slight spinal curvature, a slight alteration of the thorax, malformation of the cranium or teeth, or, less often, pelvic or limb deformity can be found on careful examination, and, as growth goes on, any such anomaly tends to increase rather than to diminish.

Etiology of Late Rickets.—Even less is known as to the cause of late rickets than of that of the ordinary form of the disease. It may occur in persons under perfectly good hygienic surroundings. Its association with infantilism suggests some disturbance of an internal secretion—possibly the thymus—but this is pure hypothesis. There is no evidence of its being an infection. Discussions as to whether florid rickets in a youth is a first attack or a relapse of infantile rickets is, when we consider how enormously frequent the latter is, purely academic and futile.

Prognosis—This is in general good, and recovery usually takes place, especially in mild cases. Complete recovery, however, cannot be expected in the worst cases of so-called juvenile osteomalacia, in which the malady may last, with remissions, for years.

Treatment.—Complete rest, good food, fresh air, avoidance of pressure on the soft bones, are essential. In the milder cases a change of occupation may be enough. Cod-liver oil and phosphorus is the best medicament. Orthopaedic surgery should be delayed until the bones are hard.

SURGERY.

UNDER THE CHARGE OF

J. W. STRUTHERS, F.R.C.S., AND D. P. D. WILKIE, F.R.C.S.

OSTITIS FIBROSA OF THE SKULL.

FRANGENHEIM (*Beitr. z. klin. Chir.*, Bd. xc, S. 121, 1914) records in very full detail a case of this rare and interesting disease. As met with in

the skull, the disease usually commences in one-half of the frontal bone, and from there spreads gradually round the walls of the corresponding orbit and into the parietal bone. In the 5 recorded cases the ages of the patient ranged from 6 to 28, but in all the disease began in the first 10 years of life. In all but one case there was a definite history of trauma. Headache was the chief symptom complained of, but defective sight and double vision developed sooner or later in all. The radioscopic findings are very characteristic, showing great thickening and irregular rarefaction in the bone, with appearances suggesting cyst formation. As the disease is progressive and tends to spread to other bones in the body, resection of the affected portion of the skull should be undertaken. A very extensive operation is required, but it is well borne, and in all five cases has given satisfactory results. In Fraunheim's case, in which it was necessary to remove one-half of the frontal bone and a considerable part of the left parietal bone, the defect in the skull was made good at a later date by transplanting a portion of scapula. The thin plate of bone, to which the infra-spinatus muscle is attached, was removed, leaving the thick rim behind, and this slightly-hollowed plate formed an admirable covering for the frontal region and healed in without difficulty.

When the affected portion of skull is examined after removal, it is seen to be four or five times the normal thickness. The inner and outer tables are hardly distinguishable, and the texture of the bone is very spongy. In some parts it is very hard, in others is mainly fibrous tissue, and here and there may be seen cysts filled with either a clear or a blood-stained content.

The etiology of the disease is obscure, but if taken early it is apparently curable, a good result following operation even when the removal of the disease has appeared to be incomplete.

CONGENITAL DISLOCATION OF THE HIP.

Sherman (*Surg. Gynec. and Obstet.*, vol. xviii. p. 62, 1914), in describing the various alterations found in the bones and soft parts, lays particular stress on two points which must be borne in mind and taken into account in the treatment of this condition if a successful functional result is to be obtained. The first of these is the constriction of the capsule at the upper part of the acetabulum, which is almost always present and offers the chief obstacle to reposition. In treating the condition this constriction must be divided. For this purpose an incision is made between the long head of the rectus femoris and the tensor vagine femoris, the capsule of the joint is then incised, and with the hip flexed a finger guides a straight probe-pointed bistoury through the constriction, which is then divided in a downward direction sufficiently to allow the femoral head to pass through. Reduction is then usually easy. In closing the wound the capsule is not sutured. A double

spica of plaster of Paris is then applied and kept on for from four to six weeks. At the end of this time the plaster is removed, when the second important deformity may require treatment. This is the antetorsion of the upper end of the femur, the presence of which will have been determined before the reduction. It consists of a forward rotation of the head and neck of the femur, so that the latter points forward when the toes point forward. This antetorsion can be recognised by taking two radiograms, one with the toes pointing forward, when the head and neck show foreshortened; and the other with the limb rotated inwards so that the toes point to the opposite foot when the head and neck show in profile.

If this antetorsion be left untreated, relaxation is very apt to occur. Sherman corrects this part of the deformity by driving a nail into the great trochanter and then performing an osteotomy of the upper part of the femur just below the nail. The latter serves to maintain the small upper fragment in proper relation to the acetabulum, whilst the limb is rotated outwards until the toes point forward, when the limb and pelvis are again put up in plaster. The nail remains in position from four to six weeks and is then removed. A shorter plaster spica is then applied, and the child is allowed to walk three months after the operation, the plaster being still *in situ*. The functional result after this form of treatment is exceedingly good. Sherman has obtained functionally normal joints in 70·3 per cent. of the cases so treated.

THE FUNCTION OF THE PERIOSTEUM.

From the writings of Macewen and Murphy we would gather that the function of the periosteum is not so all-important in relation to the surgery of bones as has been commonly supposed. M'Williams (*Surg. Gynec. and Obstet.*, vol. xviii. p. 159, 1914) records the results of careful observations, both clinical and experimental, which tend to show that in relation to bone transplantation the periosteum has important functions. In four cases where, in the human subject, bone was transplanted without periosteum the transplant was absorbed. In one of these cases, at a second operation, a portion of periosteum-covered bone was transplanted with a perfect result. In his animal experiments, in which bone was transplanted in various ways, practically every graft with periosteum lived and thrived, whereas only 48 per cent. of the grafts without periosteum were successful. He comes to the conclusion that the periosteum either favours a good blood-supply or supplies important living cells to the graft. His results are therefore at variance with Murphy's view that a bone graft is not osteogenetic, but is merely osteo-conductive, and acts as a scaffolding along which cells from the ends of the living stumps may grow. The practical conclusion to be drawn from M'Williams' observations is, that in

transplanting bone as much periosteum as possible should be taken with the graft in order to have positive assurance that it will live.

REMOVAL OF THE THYMUS.

Von Haberer (*Wien. med. Woch.*, DL lxiii, S. 2833, 1913) reports eleven cases in which the thymus was removed during operations for goitre. In five of these cases the indication for removal was great difficulty in breathing, which could not be explained by the goitre alone. In four cases the operation was carried out for very severe exophthalmic goitre. The post-operative course in these cases presented no special features. The pulse-rate decreased almost immediately, as did the other symptoms, the results being similar to the most successful cases of thyroidectomy.

In one case the benefit of thymectomy in exophthalmic goitre was most strikingly exemplified. The patient, a man, had previously undergone two operations on the thyroid without benefit, and was in a very critical condition from cardiac insufficiency. A very small thymus was removed, with almost immediate improvement, and ten months later he reported himself well, and able to climb mountains 7000 feet high. In all von Haberer's cases the thymus showed microscopic evidence of hyperplasia. There can now be little doubt that in severe cases of exophthalmic goitre, and particularly in those with pronounced cardiac symptoms, the thymus plays a part, and this fact should be considered in determining operative treatment.

COAGULÈNE FOR HÆMORRHAGE.

The annoyance of capillary oozing during many operations and the hæmatomata resulting from the continuance of such oozing after the completion of the operation impressed Kocher with the importance of finding some substance which would rapidly and permanently check this form of hæmorrhage. Such a substance must act by stimulating and accelerating the natural process by which hæmorrhage is arrested, namely coagulation, other bodies, such as adrenalin, which cause a temporary vascular constriction, all being associated with a reactive stage entailing secondary oozing. Fonio (*Chirurg. u. schweizer. Ärzte*, December 1912 to March 1913), at Kocher's request, endeavoured to evolve a practical thrombin for clinical purposes, and after several years of work succeeded in isolating the substance which now goes under the name of Coagulène Kocher-Fonio. The important part played by the blood-platelets in initiating coagulation had been definitely proved. The platelets have a lighter specific gravity than either the erythrocytes or the leucocytes, and Morawitz had shown that they may be isolated by fractional centrifugation. By this method Fonio succeeded in obtaining from mammalian blood the platelets free from all other blood elements. Bordet has shown that

blood platelets will stand a temperature of 100° C. without losing their activity, and thus Fonio has been able to produce an extract of blood-platelets which is soluble in water and which may be sterilised by heat.

This extract is put up as a powdered preparation, and for use is simply dissolved in sterile water and boiled for five minutes. In a large series of tests *in vitro* Fonio proved conclusively that animal coagulène hastens the process of coagulation at all stages, and that once coagulation begins it rapidly becomes complete. This preparation has now been given an extensive trial in human surgery, and reports concerning its usefulness are altogether favourable. Some of the operations in which it has been found to be specially valuable are bone operations, thyroidectomies, separation of peritoneal adhesions, and in laparotomies where oozing in the abdominal wall threatens a post-operative hæmatoma.

The only action of coagulène is to accelerate and intensify the normal processes of thrombus formation. It has no irritating properties, and wounds in which it has been used appear to heal quicker and with less formation of scar tissue owing to the elimination of blood-clots, and more accurate coaptation of edges thus realised.

Tarnowsky (*Surg. Gynec. and Obstet.*, vol. xviii. p. 641, 1914) records a series of cases in which he has used coagulène with great advantage, and, whilst agreeing that the preparation is still on trial, believes that in it we possess a most powerful coagulent which promises to be of great service in surgical work.

D. P. D. W.

OBSTETRICS AND GYNECOLOGY.

UNDER THE CHARGE OF

A. H. F. BARBOUR, M.D., AND J. W. BALLANTYNE, M.D.

RETENTION OF THE FOETAL MEMBRANES.

THERE is no question in the whole range of obstetrics which more commonly has to be settled by the general practitioner than that of the line of conduct he should follow when he has reason to believe that the foetal membranes (chorion and amnion) remain within the uterine cavity. His text-books are, in general, absolutely at one about the placenta, as were likewise his teachers: the risk of placental retention is regarded as so great that every part of that organ must be removed from the womb without delay. About the membranes teachers and text-books alike differ: some look upon their retention as of equal gravity with that of the afterbirth, whilst others apparently consider it of so little moment that they do not specifically mention it. Dr. M. Guildal of Copenhagen (*Arch. mens., obstet. et de gynec.*, ann. iii.

pp. 449-461, Mai 1914) is so impressed with the necessity of bringing some order into current notions and practice on this matter that he has analysed the data available at the Maternity Hospital in the capital of Denmark for the ten years from 1903 to 1912 inclusive, and he has been able to come to some conclusions which cannot fail to be helpful to those who practise obstetrics elsewhere.

A preliminary difficulty is that of definition and limitation. Dr. Guildal limits the cases to those of retention after labour at the full term, and he excludes all save the instances in which absence of the membranes at the time of the expulsion of the placenta was incontestable. Since most of the cases were under the charge of the same obstetrician, differences of opinion due to personal peculiarities were largely eliminated. There were 14,978 confinements in all, and amongst these there were 346 cases in which larger or smaller pieces of the membranes did not come away with the placenta or were not expelled immediately after it—that is to say, the percentage of membranous retention was 2.5. So far as frequency is concerned, Copenhagen compares well with other hospitals, where the percentage varies from 1 to 20, but, of course, different standards prevail as to what constitutes membranous retention. Stadfeldt's statistics for the year 1884 in this same maternity hospital gave 1.8 per cent. of retained membranes when expectant treatment of the third stage was used, 2.3 per cent. when the Crede method of expression was employed, and 1.8 per cent. when the Dublin method was in operation. It would seem, therefore, that there were at the present time more cases of retention in this hospital than in 1884: but Guildal points out that individual years show considerable differences, there having been 1.1 per cent. in 1908 and 3.7 in 1912.

Whether Crede's method of placental expression is to be blamed for an increased number of cases of membranous retention is a question which it may be difficult to settle to the satisfaction of all obstetricians, and Crede himself thought that the accident, when it did occur, was due to the manoeuvre being badly executed: but there can be no doubt that the method of managing the third stage has a decided influence on the frequency of retention cases. In Copenhagen the plan is as follows:—After the birth of the infant the uterus is controlled, and care is taken that it does not fill with blood and that there is no bleeding *per vagina*: if these things do not happen, the attendant waits until he feels that the uterus is retracted and that the placenta has passed into the lower uterine segment, and then he gets the patient to express it by bearing down, or he expels it himself by slight pressure over the fundus. If there is hæmorrhage, or if the placenta does not appear at the end of half an hour or an hour, Crede's method is tried. If this is not successful, and if the hæmorrhage continues or the risk of infection be present, Crede's plan is again tried, but now under

anæsthesia: if still there is no success, the afterbirth is removed artificially. If, during the third stage, it is found that although the placenta has separated, the membranes are still adherent, the attempt is made to separate them by turning the placenta on itself in such a way as to roll the membranes into a cord. This is usually sufficient, but sometimes slight traction is added. If the membranes were found to be incomplete, and if more than a half of them was believed to be retained, it was the custom to pass the fingers into the vagina and uterus, and to try to seize and remove the lacking pieces: but since 1911 this has been given up, for the plan rarely succeeded in getting away more than a small part, and now they are left, save that when they are felt to be tearing a pair of catch-forceps is affixed, with which the membrane can be removed when it has separated. During the puerperium treatment is symptomatic: hæmorrhage is checked with ergot, pain with hot poultices, and foetid discharges with vaginal douches of chloride of lime. Intra-uterine interference is carried out very rarely and only at an advanced date in the lying-in period.

Such is the method followed in Copenhagen, and the low percentage of membranous retentions shows that it is a good one. But whatever be the plan adopted, all obstetricians admit that placental malformations, and especially that known as the marginate placenta, favour the retention of the membranes; on the other hand, decidual disease is a somewhat doubtful cause, if, indeed, such a disease be not purely hypothetical.

The consequences of the retention of the membranes are chiefly hæmorrhage and infection. There is a considerable difference of opinion as to the severity of the former sequel: but Guildal found in the Danish cases that in not more than 7 per cent. was the bleeding so grave as to demand active treatment with ergot, vaginal injections, and the like. In other words, this symptom was only a little more frequent than in normal labours. In one case only, an X-para of 38 years of age, in whom rupture of the membranes was not followed by labour pains for seven days, was the hæmorrhage really of a serious nature: ordinary means failed, and recourse was had to the Momburg belt. Difference of opinion also exists as to the frequency and severity of infection. So much is this the case that while some obstetricians always remove retained membranes because of the risk of infection, others interfere very rarely. Speaking generally, the passive method is preferred in Germany, and the more active in France and this country. The author has very carefully examined his material during the ten years 1903-1912, in order to settle whether it is better to remove the pieces of membrane (usually by the fingers) or to leave them to come away in their own time. Up to 1911 it was the custom, when more than half the membranes were retained, to make an attempt with

fingers in the uterus, and by the intra-uterine douche to get them away: after 1911 no intra-uterine interference was practised. In the former circumstances the puerperal morbidity in these cases was 35·8 per cent., and in the latter 34 per cent. The difference, it is true, was very slight, but so far as it went it favoured non-intervention, and Guildal's conclusion is that, whilst retained membranes do raise the general puerperal morbidity slightly, the removal of them, especially by the fingers, certainly does not make the morbidity less. The membranes, if left to themselves, usually come away either in small fragments or in shreds between the fourth and ninth days. It is possible, however, that retention of the membranes may play a part in the development of endometritis at a later date.

So far, therefore, as Guildal's Copenhagen experiences go, they support the passive rather than the active method of dealing with retained membranes, even when more than a half of the chorion and amnion remains *in utero*. It is not, however, entirely satisfactory to conclude that, since the risk arising from the presence of the membranes is a little less than that coming from manual removal of them, it is better to leave them where they are. As in so many other matters, prevention is better than cure, and much better than a risk-carrying cure, and the really effective treatment is so to manage the third stage of labour as to reduce the chances of membranous retention to a minimum. This, one believes, is best accomplished by refraining from Credé's method of expulsion of the placenta in the first half hour, even perhaps in the first hour, save in the presence of dangerous hæmorrhage.

A matter of great importance is always to examine the placenta and membranes after their expulsion, so as to detect the absence of portions of the membranes, and their consequent retention either in the uterus or, far less likely, in the vagina. To do this, the placenta should be placed with its uterine aspect on the palm of one hand; the bag of membranes is then reconstituted, and the opening into it put under the water-tap so as to distend it with fluid; the obstetrician can thus easily detect the absence of any part, even if of small size. There need then be no hesitation in making uterine compression through the abdomen, a manoeuvre which sometimes brings away a lobe or an aberrant lobe of the placenta, with the membranes attached to it. If, however, such pressure does not bring away any membranes, such results as Guildal's encourage the attendant to refrain from any intra-uterine manipulations. They do not, however, warrant him in neglecting other means, non-operative in their character, of aiding the expulsion of the fragments or shreds. Thus the routine administration of a pill containing ergotin and quinine has, in the hands of some obstetricians, convinced them of its efficacy in expelling membranous remnants. The slight raising of the upper end of the bed has also acted bene-

ficially in some maternities; and it is a question whether the now abandoned post-partum vaginal douches, at a temperature of 112° to 118° F., did not aid the expulsion of pieces of chorion and amnion which had been left *in utero*. A difficult case is that in which a shred of membrane can be seen at the vulva or felt in the lower part of the vagina. If it does not come easily away with the slightest traction, what is to be done with it? Should one do as Tarnier advised, and tie a ligature round it wherewith to make traction each day until it comes away? Both Maygrier and Guildal think it is safer not to do so, for the ligature may act as a drain through which infection may ascend into the uterus. There could, perhaps, be no objection to placing a light pair of catch-forceps on it, so as to make continuous but gentle traction, so long as the forceps was protected from accidental interference.

It is a somewhat curious fact that a matter such as this, dealing with so common an occurrence as membranous retention, should be so seldom considered in periodical obstetrical literature. If all were at one as to the best manner of dealing with it, there would be less cause for anxiety: but, as everyone knows, different doctors and different hospitals employ divergent plans. If comparisons between different methods of dealing with this accident are to be instituted, it will be necessary for the observers to adopt an identical system of registering puerperal morbidity.

J. W. B.

THERAPEUTICS.

UNDER THE CHARGE OF

JOHN EASON, M.D.

DIGITALIS IN ARRHYTHMIA.

IN a general way one may say (Martinet, *La Presse Méd.*, No. 29, 1914) that digitalis is contra-indicated in the bradycardias, whatever be their origin, and it is more particularly contra-indicated in bradycardias of intra-cardiac origin. Above all, it is contra-indicated when there is a tendency to auriculo-ventricular dissociation. If the dissociation is complete the contra-indication is not so strict. The tachycardias constitute a precise indication for digitalis treatment. In fact, digitalis is quasi-specific in the tachyarhythmias (complete arrhythmia, perpetual arrhythmia, etc.) which so frequently accompany the asystolic state.

Perpetual arrhythmia (*delirium cordis*) the electro-cardiograph has demonstrated to be due to a particular form of auricular contraction known as auricular fibrillation, in which a systole complete or incomplete is never realised. Minute observation shows, however, that there is incessant and extreme auricular activity in the form of

undulations. The effect of this auricular confusion on the ventricle is a double one. The ventricles do not receive the regular excitations which determine their normal contraction. These excitations are replaced by numerous inco-ordinated impulses of the auricle, of which only some reach the ventricles.

Martinet gives three practical rules:—

1. Tachyarhythmia over 120 is nearly always linked with auricular fibrillation and perpetual arrhythmia. Exceptions are febrile, emotional, nervous, and paroxysmal tachycardias.

2. All permanent arrhythmias with signs of advanced cardiac exhaustion are almost certainly dependent on auricular fibrillation. This probability becomes quasi-certain if the arrhythmia is associated with tachycardia.

3. All arrhythmias, even when unaccompanied by actual evident signs of cardiac exhaustion, which are increased by the acceleration of pulse provoked by moderate exertion, are probably a. perpetua. (Other arrhythmias, and especially extrasystoles, tend to disappear under the influence of accelerated pulse.)

Clinical experience shows that it is precisely in these cases, and more especially in the asystolic state of the rheumatic valvular cardiopathies, that digitalis gives the most remarkable results. It seems that digitalis does not usually influence the auricular fibrillation itself, but the partial block which it determines or increases prevents or reduces the passage of disordered excitations from the auricle to the ventricle, thus reducing the frequency of ventricular systoles and permitting repletion of the ventricles and more effective contraction.

Clinical experience also indicates there is no important reason for the administration of digitalis in other forms of tachycardia—emotional, febrile, nervous, paroxysmal, etc.

At all times when there exist transitional forms of paroxysmal tachycardia and tachyarhythmia with fibrillation, digitalis may give satisfactory results.

In other forms of arrhythmia, and more especially extrasystoles and pulsus alternans, general clinical experience is opposed to the use of digitalis.

PITUITRINE.

Beco and Plumier (*Bull. de l'Acad. roy. de méd. de Belg.*, t. xxviii., No. 10, 1914) have experimentally demonstrated that pituitrine causes a moderate rise of blood-pressure, reduction of the pulse frequency, but has no diuretic action.

The increase of general pressure depends on vaso-constriction of the vessels of the limbs and viscera. It is independent of the general vasomotor centre.

Reduction of the pulse frequency disappears quickly on section of the vagus in the neck or by producing paralysis of the terminals of those nerves by atropine; it therefore appears that this reduction of the pulse may be dependent on excitation of the vagus centre.

Beco has for many months been studying its action clinically.

Twenty cases of chronic myocarditis, with or without concomitant valvular lesions, and in a state of hyposystole or asystole, one case of Laennec's cirrhosis of the liver with great ascites, and one case of subacute pleurisy with much *'panchement'*, have been treated.

The pituitrine was administered in four cases by subcutaneous injection, in two by intramuscular injection, in nineteen by intravenous injection. The dose varied from 0.5 c.c. to 8 c.c. The strength was 1 in 5 as supplied by Parke Davis' preparation.

It was injected without further dilution for subcutaneous and intramuscular injection. For intravenous injection it was diluted in 4 parts warm physiological salt solution, and later 1 in 6 parts, without any secondary phenomena following upon the change in concentration being observable.

The pulse and respiration frequency, the volume of the urine, the arterial pressure, maximal and minimal of Pachon, were noted before and after injections.

In nearly all cases they had occasion to compare the action of pituitrine with those cardio-tonics and diuretics habitually employed—with crystallised digitaline, theocine acetate, etc.

The conclusions arrived at are, that the subcutaneous or intramuscular injection, even of large doses, is very well borne. The action upon the frequency and rhythm of the pulse, upon the respiration, arterial tension, and diuresis was absolutely none. Intravenous injections have caused 11 times out of 19 troublesome secondary phenomena.

A very few minutes after the injection the patient complained of vertigo, cephalalgia, sensation of flushing of the face, humming in the ears, tendency to syncope, oppression and feeling of constriction in the thorax, weight in the lumbar region, abdominal malaise, colic, with constant imperative desire for defecation, which proved ineffective. The patient is anxious, his face pale and covered with sweat, the extremities are cold and cyanosed, whilst the pupils are normally dilated, and the axillary and rectal temperature does not vary. Sometimes the patient complains of a bitter metallic taste in the mouth.

These phenomena, which to all appearance are due to a peripheral vaso-constriction and an excitation of the autonomous nerves of the pelvis, are always evanescent. They disappear, after 5 to 40 minutes, without leaving any evil effects.

One constantly observes a transitory diminution, more or less

marked, in the frequency of the pulse, and a transitory acceleration of the respiration.

Fairly often the maximal arterial tension is raised for some hours from $\frac{1}{2}$ to $1\frac{1}{2}$ centimetres. The minimal tension is more rarely affected. Sometimes it is also raised, but it may be depressed. The action on diuresis has been *nil* in 23 cases. In 2 cases diuresis was increased.

Minet et Martin (*L'écho méd. du Nord*, 1914, p. 193) report the result of the administration of pituitrine in the treatment of hæmoptysis. In 20 cases of hæmoptysis due to tuberculosis in all stages, cancer, infarct of the lung, it was entirely successful in 19. Half a cubic centimetre of Parke Davis & Co.'s preparation was given intramuscularly, and repeated if necessary. In two cases only a third injection was given. They had recourse to intravenous injection only in those cases in which the first intramuscular injection was unsuccessful. They observed no general or local reaction such as Beco or Rist observed. They attribute the therapeutic action to diminution of the tension in the small circulation, stimulation of the muscular coats of the pulmonary vessels, and very energetic coagulent action.

SPLENECTOMY IN SPLENIC ANÆMIA.

Sargent reports a case of splenic anemia treated by splenectomy (*Proc. Roy. Soc. Med.*, vii, No. 5, p. 76). The patient was a female, aged 10, in whom the abdomen was enlarging. There was ascites and slight pyrexia. The abdomen was opened on the supposition that the case was one of tuberculous peritonitis. Much clear fluid escaped but nothing abnormal was felt. A fortnight later the edge of the spleen was palpable. The blood count was: Erythrocytes, 4,300,000; hæmoglobin 40 per cent.; colour index, 0.5; moderate poikilocytosis; fair number of normoblasts; white cells, 2000; polynuclear neutrophiles, 63 per cent.; small lymphocytes, 33 per cent.; large lymphocytes, 3 per cent. The spleen was removed two months after she came under observation. The child made an uninterrupted recovery. Six weeks later there was severe hæmatemesis, and she was admitted to St Thomas' Hospital. The liver was palpable. Erythrocytes, 2,936,250; white cells, 29,260; polynuclear neutrophiles, 55.25 per cent.; small lymphocytes, 40.25 per cent.

She had irregular pyrexia for a few weeks and a varying amount of diarrhoea. She was treated with liquor arsenicædis. When discharged the erythrocytes were 3,028,125; hæmoglobin was 35 per cent.; colour index, 0.6; very few normoblasts; white cells, 9100; polynuclear neutrophiles, 59.75 per cent.; small lymphocytes, 18.25 per cent.; large lymphocytes, 18.25 per cent. There was neither enlargement of the liver nor ascites. The latest blood count showed a normal number of reds, no normoblasts, and no evidence of poikilocytes.

Polynuclear neutrophiles, 35 per cent.; small lymphocytes, 58·5 per cent.; large lymphocytes, 1·5 per cent.

Dr. Herbert French also reported an entirely favourable result of this treatment in a similar case, due, however, to congenital syphilis. It is important to recognise that not only typical cases of Banti's disease, but also splenomegalies due to congenital syphilis, are amenable to treatment by splenectomy, especially in view of the fact that Banti regards the latter type as differing from the disease known by his name. This case is important for another reason, as pointed out by Dr. Parkes Weber, that such cases do not respond to antisyphilitic treatment. Hoffmann at the same meeting reported a favourable result obtained in a girl of 12.

Essex Wynter and Sir J. Bland Sutton, Thursfield, and Sir Bertrand Dawson, also described highly satisfactory results (*i.e.* "cure") from splenectomy in cases of acholuric jaundice (*idem*, pp. 82 and 84).

VACCINES.

Dr. Samuel West (*Proc. Roy. Soc. Med.*, vii. No. 5), in summing up the results of the discussion on vaccine therapy at the Royal Society of Medicine, stated that a sharp distinction must be drawn between cases of acute general infection and those in which the infection is subacute or chronic. Thus vaccine therapy in septicæmia, malignant endocarditis, acute meningitis, and typhoid fever is very disappointing. In pneumonia also the results are not encouraging. One great contra-indication to the use of vaccines appears to be acute generalised infection, as it is in this group that the instances most frequently occur in which definite harm follows their use.

The widespread use of vaccines, which now prevails in ordinary practice, is essentially unscientific, and cannot yield results of any practical value. No permanent harm seems to follow from their use, but temporary harm may occur, sufficient, it may be, to compel their discontinuance. There seems also to be no doubt that long-continued vaccine treatment has its dangers, for patients may fall into a condition of profound asthenia and die of it.

Vaccine treatment is in most cases not successful by itself, unless supplemented by ordinary treatment. When pockets of infection are present, vaccines will do little or nothing till draining is complete, and it is from these pockets that re-infection and consequent recurrences occur. Yet drainage alone without vaccines may suffice to cure. When Nature, aided by the ordinary methods of treatment, is proved to have failed, we may be able to prove the value of vaccines. One thing is quite clear, that a general indiscriminating haphazard use of vaccines can only bring the method into disrepute and retard progress.

EMETINE.

Low (*Proc. Roy. Soc. Med.*, vii., No. 6), summarising the results of recent work on the action of emetine, states that in amoebic dysentery the amoebae become encysted, and then apparently the emetine cannot kill them, this stage being a very resistant one. At later periods these become transformed into the living forms again, and so produce relapses. Treatment, therefore, for amebiasis must be conducted on similar lines to that of malaria by quinine.

Suitable doses must be given and kept up for prolonged periods. He gives $\frac{1}{2}$ -gr. doses of emetine hydrochloride until 10 grs. in all have been taken. Then, if all symptoms have abated, the drug is stopped and the patient kept on a strict diet. Some cases even after this relapse, and then a second course of the emetine has to be given. Sometimes injections are inconvenient, and in these instances keratin-coated "tabloids" may be tried. His experience of these is that some patients can take them without vomiting or any unpleasant symptoms: others are sick for the first day or two, then tolerate them: while a third group keep on being sick each time they take them. In this latter class injections must be substituted. The dose by the mouth is $\frac{1}{3}$ to $\frac{1}{2}$ gr., and if not vomited is quite as effective as injections. As regards the latter, it is more satisfactory to inject the drug intramuscularly than subcutaneously. Some stiffness may even then result, so it is well to vary the site of injection.

In addition to the emetine treatment a milk diet first, and then later a milk and white meat diet, must be insisted upon, and no alcohol in any form is to be allowed. The patient should remain a teetotaler for a year or more after all signs of the disease have disappeared.

Emetine has lately been tried in the treatment of hæmoptysis and intestinal hæmorrhages. Flaudin treated eight cases of hæmoptysis, and in all of them, with the exception of a galloping case of tuberculosis, the hæmorrhage was definitely arrested, the bleeding stopping immediately. No nausea or depression followed the administration of the drug. If, after one injection, there is a tendency for the hæmorrhage to return, Flaudin gives a second injection twelve hours later, and again on the following day. His dosage was 0.04 c.c. of emetine hydrochloride dissolved in 1 c.c. of distilled water. The arterial pressure was taken before and after administration of the drug and no change was noted in it, in the coagulation time of the blood or the blood count. These results have been confirmed by other physicians. Renon obtained similar results in two cases of pulmonary carcinoma.

Renon, Valassopulo, and Edham have each obtained good results in hæmorrhage from a carcinoma of the large intestine, muco-membranous enterocolitis, and other causes of bleeding from the bowels. Low, in five cases of intestinal hæmorrhage, due to biliary cirrhosis, typhoid,

ulcerative entero-colitis, and chronic nephritis, has had rapid and excellent results. Renon advises doses up to 9 cgrms.

Why emetine should be a useful means of arresting hæmorrhage is not altogether clear, but as it has been stated that the drug exerts a powerful local constricting effect upon blood-vessels, it is possible that this is the explanation of its action in these cases. J. E.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

W. G. SYM, F.R.C.S., AND ANGUS MACGILLIVRAY, M.D., D.Sc.

TRACHOMA AND ITS SURGICAL TREATMENT.

IN a recent monograph by L. Webster Fox, M.D., LL.D., Philadelphia, the author states that trachoma or granular conjunctivitis is a contagious specific disease of the palpebral conjunctiva, characterised by increased thickening and vascularity and the formation of granular elevations or lymphoid infiltration which undergo ulceration and subsequent cicatrisation.

Diligent search has been made by many competent observers for the micro-organisms to which trachoma is due, but Muttermilch and many others doubt the existence of a specific organism.

The recent studies of Halberstädter and Prowazek seem, however, to have led to the discovery of so-called trachoma bodies, which are believed to occupy a position morphologically between bacteria and protozoa.

Trachoma is found most frequently in barracks, asylums, almshouses, and places where the inhabitants are careless in the use of towels, handkerchiefs, and similar personal articles.

As already stated, it is particularly common among immigrants, especially the Armenians, Syrians, and Russian Jews, but the American negro seems to be comparatively immune to the affection, while the American Indian is extremely susceptible to it.

According to the last report of the Commissioner of Indian Affairs, there are 4000 Comanche, Kiowa, and Apache Indians on the Kiowa reservation in Oklahoma, of whom no less than 65 per cent. are affected with the awful scourge of trachoma.

The disease is usually chronic, although occasionally acute cases may be observed in which there are marked inflammatory symptoms and profuse purulent secretion, the severity of certain attacks being probably due to a concomitant acute conjunctivitis, or an exacerbation of the symptoms as the result of freshly-developing follicles. These cases resemble purulent conjunctivitis, and often the diagnosis must be withheld until the granulations are visible. It is usually bilateral.

In many cases the initial course of the disease is so insidious that

the patient is not aware of its presence until it is well developed. The changes in the palpebral conjunctiva are slowly progressive: the membrane becomes thickened, vascular, and roughened by firm hemispherical elevations. This change usually takes place first in the upper lid, later extending to the lower lid, giving rise to the growth of considerable organised new tissue in the deeper parts of the conjunctiva. Externally, œdema and vascularity of the lids is noticeable, while the ocular conjunctiva is congested and has an angry appearance: slight photophobia and lachrymation are present, and a "gritty" feeling, due to the roughened condition of the palpebral conjunctiva, is experienced by the patient. If the lids be everted in the early stages of the affection, the surface is found covered with small granular bodies, which look very much like small sago grains, scattered or massed together (follicular trachoma), constituting the chief feature of the clinical picture. In the later stages this tissue is partly absorbed and partly converted into dense, tendinous scar tissue, which, by its shrinking, very often produces deformities of the lids. In all cases the eyeball is greatly irritated by the roughened surface, producing a host of resultant troubles by mere friction. In many cases the inflammation is intense, the discharge profuse, the cornea becomes involved early, and only prompt and vigorous treatment can prevent complete blindness. A mixed infection may exist with the trachomatous process. Koch (*Wien. med. Woch.*, 1883) in Egypt found both the gonococcus and what is now classified as the Koch-Weeks bacillus in the discharge from the conjunctiva of trachoma cases. The trachoma granules in some cases are deeply imbedded beneath the thickened opaque conjunctiva, or in the masses of fibrous tissue that have developed in the lid, so that they can hardly be seen, if at all (papillary trachoma). The lid becomes swollen, and droops by reason of its increased weight. The palpebral fissure becomes more narrow than normal. There is always a muco-purulent discharge, considerable in amount in acute cases and scanty in those of long duration.

The troublesome sequelæ of trachoma are all natural consequences of the friction of the roughened palpebral conjunctiva. As a rule, mere removal of the causal condition effects their disappearance. In certain cases, however, this is unfortunately not true. The cicatrices following the absorption of the granulations may so "pucker" the conjunctiva as to draw the edge of the lid inward, producing trichiasis or entropion; in either case the friction is greater than that directly due to the trachoma. The most frequent and troublesome sequel of trachoma is pannus. Corneal ulcers, staphyloma, and symblepharon may also occur.

Various medicaments of an astringent character have long been employed in the treatment of trachoma. Among these are various solutions of the silver preparations—the nitrate of silver, protargol,

argyrol, etc. Copper sulphate has been used by many in preference to all other applications, and in the milder forms of the disease happy results have been achieved by this and other astringents, when continued for a sufficient length of time.

It is sometimes possible to hasten the cure by everting the lid and excising the granular formation with scissors, or by scraping the tissue down to the basement membrane with scoop and scalpel. This operation was practised by the author as early as 1885. The tendency in the present day is to treat the more chronic and obstinate cases by some surgical method which will bring about a rapid disappearance of the granulations and correct the distorted condition of the eyelids.

The particular object of Dr. Webster Fox's paper is to describe the grattage operation. While the writer was in Paris in 1892 he saw it put to a practical test by Dr. Darier, clinical chief to Dr. Abadie. An opportunity was also afforded of examining a number of patients upon whom the operation had been performed with gratifying results.

Two instruments have been specially devised for the operation—a forceps and a scarificator. Any procedure which has for its aim the destruction of the granulations must be commenced by a complete exposure of the palpebral conjunctivæ, including the retrotarsal folds and the cul-de-sac of the upper lid. This is best effected by means of Darier's forceps, which resembles a catch dressing forceps with three pins on the male blade. When the instrument is closed the pins pass through corresponding openings in the opposing or female blade: these points pierce the eyelid to prevent slipping when complete eversion of the lids is made.

The second instrument is a tri-bladed scarificator or scalpel. The outside blades are jointed so that they may be easily turned when being cleaned. They are held in place in a platinum handle and make parallel incisions. The operation is performed in the following manner:—The upper eyelid is grasped along its margin by means of Darier's forceps, and the edge being turned upon itself, the lid is everted until the retrotarsal fold is brought into view. A horn spatula should be inserted beneath the lid to protect the cornea. The exposed conjunctiva is first thoroughly scarified with the three-bladed scalpel. The granular tissue is then scrubbed with a tooth-brush which has been steeped in a corrosive sublimate ($\frac{1}{1000}$) solution just before being used.

Immediately after scrubbing the part is washed with a solution of the same strength. Another portion of the lid is now unrolled and the scarifying, scrubbing, and washing repeated until the whole of the palpebral conjunctiva has been subjected to the treatment. If the lower lid is involved in the trachomatous process, it should be treated in exactly the same way.

In the soft gelatinous variety of granulations the writer has found

that by using ordinary gauze sponges he has been able to smooth down the elevations and clean off the conjunctiva of both lids, leaving it perfectly smooth, so that in a few days all evidences of the trachoma have disappeared, but especial care has been observed to reach the fornix and every other portion of the diseased surface.

In a case which recently came under his care, in which there was implication of the cornea with pannus, the blood-vessels of the latter disappeared at the end of a week with but slight reaction. An anti-phlogistic lotion is applied over the lids in addition to cold compresses day and night. The eyelid can usually be opened in twenty-four hours without pain or annoyance. It is surprising how little reaction ensues upon this apparently harsh procedure. (Dr. Coover of Denver uses sandpaper soaked in sublimate solution with much success in similar cases.) The patient is put to bed and the eyepads are kept saturated for two or three days. If the operation has been properly carried out the results are exceedingly gratifying, and it rarely happens that the operation must be repeated on the same patient, proving that a re-infection seldom takes place. The writer feels convinced that this disease is a curable one, and that a modification of the immigration laws should be made in certain cases, especially where father and mother are free from trachoma, and possibly one child of the family only is attacked. This child, under proper treatment, can be cared, and should not be deported, as the present American law demands.

The French method consists of everting the eyelid after twenty-four hours and again applying the corrosive sublimate ($\frac{1}{1000}$) solution to the conjunctival surface. This procedure is very painful and unnecessary.

Frequently a Burow's operation—cutting through the cartilage on the conjunctival surface from the inner to the outer canthus—performed at the same time aids the grattage by expanding the eyelids. In trachoma the swollen condition of the conjunctiva and cartilage prevents the free movement of the eyeball, and by exerting pressure produces pain and aids in the formation of pannus. Slitting the cartilage by Burow's method relieves this pressure and averts its consequent danger.

The writer has often had reason to repeat the remark of Dr. Couper of Moorfield's Eye Hospital, that "If there ever was a man who deserved a monument for devising an operation in ophthalmic surgery it was Burow." Extirpation of the tarsus, as recommended by Kuhnt, is exceedingly beneficial in cases of chronic trachoma associated with great infiltration and thickening of the tarsus.

Success has undoubtedly attended the mechanical pressing out of the granular formations by means of trachoma forceps, and even by the pressure of the thumb nails. Electrolysis has been employed by a number of ophthalmic surgeons for the removal of the granulations of

trachoma. The radium treatment of this intractable disease has given encouraging results to several practitioners.

From the time the writer witnessed the performance of the grattage operation by Dr. Darier in Paris, which afforded him the opportunity of becoming conversant with its technique, he has performed the modified operation, as described above, in many hundreds of cases, especially among the Indian children of the Carlisle school, with exceedingly gratifying results.

Dr. Jacovidès, of Alexandria in Egypt, states that he has performed grattage on 15,000 cases of trachoma and has been perfectly satisfied with the results, having had but few relapses. His confrères in Egypt have had similar experiences in the employment of this treatment.

In some cases of trachoma it is no easy matter thoroughly to evert the palpebral conjunctiva of the upper lid. The eyelid everter, an instrument devised by the author, will, however, enable the surgeon to expose the retrotarsal fold of the upper cul-de-sac with perfect ease.

A. MACG.

NEW BOOKS.

An Investigation into the Disease of Sheep called "Scrapie." By J. P. M'GOWAN. Pp. xii. + 116. 25 Figs. Edinburgh: Blackwood & Sons. 1914. Price 2s.

THE advantages of applying the strict scientific method to the investigation of the diseases of farm stock are strikingly shown in this laborious research, published under the auspices of the Edinburgh and East of Scotland College of Agriculture. Since before the middle of the eighteenth century an obscure and fatal sheep disease, known by half a dozen local designations, the Scottish one being "scrapie," has attracted the attention of Scottish and English farmers, with the result that isolated symptoms have been recorded, various antagonistic theories of the cause and spread of the disease have been propounded, and such different means adopted for the check of the disease as the experience of each flockmaster seemed to suggest. The investigations of continental scientists have been of little more service, for although their work as a whole foreshadows the completed story, none have succeeded in touching the foundation of the problem.

Dr. McGowan's investigation confirms in the main, and completes, results indicated in a paper read by him before the Pathological Society of Great Britain and Ireland in 1913. He brings together all the information available regarding "scrapie," and in the light of his own observations and experiments binds this into a consistent theory of the cause, origin, and spread of the disease. A few of the more important results of his researches may be indicated.

It is clearly shown from contemporary quotations that the disease

has been widely spread in England and South Scotland for more than 150 years. One of its most telling symptoms is pruritus, united in the final stages with emaciation and indications of paresis. Post mortem examination revealed that these symptoms were in every case associated with the presence of large numbers of the protozoan parasite, *Sarcocystis tenella*, embedded in the muscles, and further, that "their numbers were proportional to the stage of the disease." Extract of the sarcocysts, containing the toxin, sarcocystin, as well as extract of "scrapie" muscle, produced pruritus when injected into rabbits. It is fairly evident then that "scrapie" in the sheep is an advanced sarcosporidiosis, the paresis being due to mechanical interference of the parasite in the muscle.

Some exceedingly interesting and significant observations were made on the structure and biology of *sarcocysts*. The presence of a polar capsule in the sickle stage is noted, and in a dilute watery solution of glucose this stage underwent progressive transformations, which possibly indicate its normal ontogeny. These observations, taken with the results of recorded feeding experiments, lead Dr. McGowan to suggest that the infective agents are the granules released by the breaking down of the sickle, that these ($1\ \mu$ in diameter) reach the embryo *in utero*, and that the spread of the disease is due to congenital infection, and not to contagion, as many stock-breeders have affirmed. These conclusions are borne out by sitting of the epizootiological evidence, and suggest modes of checking and exterminating the disease.

Dr. McGowan is to be congratulated on the completion of an investigation which reveals matter of interest and great value alike to the student of practical farming, of pathology, and of zoology.

Practical Bacteriology, Microbiology, and Sanitary Technology (Medical and Veterinary). A Text-Book for Laboratory Use. By Dr. A. BESSON. Translated and Adapted from the Fifth French Edition by H. J. HUTCHENS. Pp. xxxi + 892. With 416 Illustrations. London: Longmans, Green & Co. 1913. Price 36s. net.

AN English translation of Besson's well-known book would in any case have been welcome, but the value of the present volume is very much enhanced from the fact that Professor Hutchens has elaborated several parts of it, and has incorporated the results of English investigators, which do not find a place in the French edition. The work thus represents the French and English attitude towards the subject of microbiology in a very comprehensive and thorough way. The book throughout deals with methods and established facts rather than with theoretical considerations, and will be constantly referred to by laboratory workers. The parts dealing with methods are very full, and the

directions include minute practical details, and almost no important technical procedure has been omitted, though, curiously enough, the section dealing with the Wassermann reaction in syphilis does not include reference to the more recent work, especially of British investigators.

The book is divided into seven parts, dealing with general technique, the characters of the pathogenic bacteria, the parasitic fungi, the pathogenic spirochaetes, the protozoan parasites, filterable viruses, and the application of bacteriological methods to the examination of water, sewage, and air. In each case the treatment of the subject is characterised by great thoroughness. Special mention may be made of the chapter on the microscope, which has been amplified by Professor Hutchens so as to form a valuable account of the theory of this essential instrument, and in the systematic account of the bacteria the chapters on the *Salmonella* and *Pasteurella* groups of the bacilli are specially noteworthy. Amongst the protozoa, while full attention is given to the ordinary haematozoa and flagellata, a large amount of information has been brought together bearing on the less known parasites of this group. Taken as a whole, the book will be found to be an absolutely necessary work of reference on the shelves of the practical microbiologist, and its value will be much enhanced by the full and admirable way in which it is illustrated.

The Psychopathology of Everyday Life. By Professor Dr. SIGMUND FREUD, LL.D. Authorised English Edition. With Introduction by A. A. BRILL, M.D. Pp. viii. + 342. London: T. Fisher Unwin. 1914. Price 12s. 6d. net.

IN his short introduction to Freud's *Psychopathology of Everyday Life* Dr. Brill states that, tracing back the abnormal to the normal state, Freud found that the line of demarcation between the normal and neurotic person was so faint as here and there to become obliterated. In short, we are all more or less—mostly less—insane. It naturally follows that the Freudian procedures—psycho-analysis and free association—can be applied to the little slips, lapses of memory, and chance actions which, when one comes to think of it, occur with quite surprising frequency to everybody. Indeed, they are such common accompaniments of—may we say normal—mentality, that nobody pays any great heed to them. The slips and forgetfulnesses to which the book is directed are the forgetting of proper names, of foreign words, mistakes in speech, mistakes in reading and writing, the forgetting of resolutions, erroneously carried out actions, errors, mislaying things, and the like. By examining these phenomena in himself and in others Freud's general conclusion is that they are due to repression: that we forget or make the mistake because the idea is attached to some painful complex which is repressed or censured—often merely that we forget

(genuinely forget) to perform some distasteful duty because we do not wish to do it. This, in a very general way, is the result of Freud's work, and when one reads his examples, and still more investigates one's own lapses by his method, it is surprising how often such an explanation is forthcoming. One of the most interesting chapters is that on chance, superstition, and determinism. Thus it would seem that if anyone is asked to name, on the spur of the moment and without reflection, a number containing 5 or 6 figures, the choice made is never really a random one. By free association the factors which determined the selection can be discovered, and this although, of course, the subject of the experiment is quite unconscious of any selective agency. Freud's view of chance mental happenings, which in superstitious minds are looked on as omens, is that such unintentional manifestations of mental activity contain something concealed which belongs to the mental life of the person experiencing them. The superstitious person projects the motive for the happening outside, and then explains it by an event. An extension of this leads to the suggestion that a large part of the mythological conception of the world is nothing but psychology projected into the outer world. Altogether *The Psychopathology of Everyday Life* is a most illuminating book, and ought to be read by everybody who wishes to understand his own mental processes—surely of all forms of egotism the most pardonable.

The Myth of the Birth of the Hero. By Dr. OTTO RANK. Translated by Drs. F. ROBBINS and SMITH ELY JELIFFE. Pp. 100. New York: The Journal of Mental Disease Publishing Company. 1914. Price \$1. (Nervous and Mental Disease Monograph Series, No. 19.)

THIS is a valuable addition to this excellent series of monographs. It is an attempt to interpret mythology by the psychological method, which, nowadays, means that myths are looked on as "folk dreams," and are interpreted on Freudian lines. We are far from saying that these attempts are completely successful—indeed one has only to remember the almost pathetic diffidence with which Dr. Frazer, the greatest comparative anthropologist now living, speaks in the preface to his last work of the task of unravelling the origin of myths and customs, to feel that it is and will remain the last of all riddles—but they are none the less highly interesting and suggestive. The principal sacred and heathen myths of heroic birth are compared and analysed—*Edipus*, *Paris*, *Moses*, *Romulus*, *Siegfried*, *Tristan*, *Lohengrin* may be cited as examples. The remarkable similarity of the Hebrew, Greco-Latin, and Scandinavian sagas cannot fail to strike even the unpractised reader, and whether we adopt the theory of a common origin of all these myths, or suppose that they arose more or less independently from some innate tendency of the human mind (an hypothesis which is

more attractive to the reviewer), we are none the less face to face with the problem of where the material came from to begin with, or, in other words, why the myth shaped itself as it did. Some of the features which are common, more or less, to all these sagas are the birth of the hero to royal parents, his origin being preceded by difficulties, such as barrenness or continence; the occurrence of prophetic oracles antedating his birth, often threatening danger to his father; his consequent exposure, often in a box in the water, or banishment; his rescue and nurture by lowly people or by animals; and finally his recognition in manhood after a youth of obscurity. In brief, the interpretation of these myths is found in the latent antagonism of the son to his father, which is based ultimately on sexual jealousy. The foundation for this hypothesis is, again, the interpretation of personal dreams, especially that group of dreams associated with the expression "the Edipus complex." The whole question of the application of Freud's psychology to the explanation of myths is of the greatest possible interest, since, if it be ultimately shown that it affords a rational interpretation of mythology, it will thereby, it seems to us, entrench for itself a strong claim for general validity.

Clinical Examination of the Blood and its Technique. By Professor A. PAPPENHEIM. Translated by R. DONALDSON, M.B., F.R.C.S. (Edin.). Pp. viii. + 87. Bristol: John Wright & Sons, Ltd. 1914. Price 3s 6d. net.

IN this small manual Professor Pappenheim has described for the general practitioner the methods of blood examination used by himself. Only one method of staining is described, namely, the author's modification of the May-Giemsa stain. Undenially, very beautiful results are obtained by this method, but if a busy general practitioner has only at his command a method of staining which takes twenty minutes to execute, he is but poorly equipped. In addition to the usual methods of hemocytometry and hemoglobin estimation, two new methods are described, and the differences between normal and pathological blood briefly indicated. The manual is interesting as an exposition of Professor Pappenheim's methods, and Dr. Donaldson has been successful as translator.

On Dreams. By Professor Dr. SIGMUND FREUD. Authorised English Translation by M. D. EDER. With an Introduction by W. LESLIE MACKENZIE, M.D. Pp. xxxii. + 110. London: William Heinemann. (N.D.) Price 3s. 6d. net.

THE keynote to an understanding of Freud's theory of mental processes is to be found in his studies of dreams. Dreams, according to Freudian psychology, are to a large extent the gratification of unfulfilled wishes. From this point of view they may be looked on as

mental mechanisms for protecting the slumberer from the intrusion of unpleasant thoughts. In a dream there is always present an element derived from the experience of the preceding day, to which are linked in the most bizarre and apparently random manner all kinds of contradictory ideas. In a child, it would seem, dreams are comparatively simple; it is only in older people that the complicated fantastic dream occurs. Freud calls the fantasy the manifest dream content, and shows how this fantasy represents a latent dream content. How the latent dream content is to be discovered is by the method of psycho-analysis, or free association of ideas. The examples quoted in this, the most popular of all Freud's writings, are enough to give the reader an idea of the author's method and results. Some of Freud's interpretations will seem far-fetched to many; here, of course, it has to be remembered that his experience of the analysis of thousands of dreams entitles him to be listened to with respect. For the rest, the reviewer confesses that the application of Freud's method to his own dreams has sufficed in many cases to explain them to him in the most extraordinary way, and he can, at least, assure those who take the trouble to do likewise that the dream world will become almost as interesting as the world of day.

The book will, we are sure, find many readers. Mr. Eder's translation appears to be excellent, and he has judiciously omitted certain passages which might have been a stumbling-block to English students. Dr. Leslie Mackenzie contributes an appreciative introduction.

The Biology of the Blood-Cells, with a Glossary of Hematological Terms: For the Use of Practitioners of Medicine. By O. C. GRUNER, M.D.(Lond.). Pp. xii. + 392. With 82 Illustrations. Bristol: John Wright & Sons. 1913. Price 21s. net.

THE writer of this volume is a disciple of Pappenheim's school of hæmatology, and throughout the work he faithfully follows the lead of his master. The book is an up-to-date and somewhat ultra-scientific review, which will form a valuable work of reference for the specialist in hæmatology, and the ordinary practitioner of medicine, for whom it purports to be written, will be apt to be lost in its technical details and complex terminology—though in the latter difficulty he will be assisted by a very complete glossary at the end of the book, where he will be initiated into the meaning of such terms as "anisohypercytosis," "autoparenchymatous metaplasia," "basicytoparaplastin," "erythro-neocytosis," "chromotoxic hyperchromanæmia," "microlymphocytar(-oid) lymphoblastic plasma-cell," "microlymphoidocytar myelolymphocytic leukæmia," and the like, which might perhaps otherwise puzzle him. As the above terms may indicate, the whole book bears the stamp of the German type of scientific mind. It is extremely thorough, and as a review of the work of others it is in parts critical.

but in others too little so. Much that is included might with advantage be left out, as the subject-matter tends to be ponderous and unreadable. The ultra-scientific character of the book may be indicated by the reduction of the physiological and pathological ontogeny and phylogeny of a cell series to formulæ such as: $y = t \tan a + b = z$ and $y = r \sin (qt + e)$, etc. For a work of this character the text is singularly free from typographical errors, though a few do occur, *e.g.* "Karyor-rhexis," on p. 81.

The work is evidently that of an enthusiast in his subject, and should stimulate others interested in the important problems with which it deals, by suggesting new lines of research in hæmatology. The coloured plates are excellent, and the charts dealing with the development of blood-cells are suggestive and helpful, even though on many points one may venture to differ from the views laid down in them. The indexing is very complete, a good bibliography is given, and all credit must be given to the author for the laborious care which he has expended upon his work.

Sexual Ethics. By ROBERT MICHELS. Pp. xv. + 296. London: The Walter Scott Publishing Co., Ltd. 1914. Price 6s. net. (Contemporary Science Series.)

WHETHER for good or ill, feeling in this country is against any detailed discussion of sexual problems in the press, medical or lay, and, indeed, of the numerous books on such topics, many, quite deservedly, are not reviewed at all. We do not propose to depart from the usual custom further than to say that Professor Michels' book is a serious contribution to a very difficult and important subject, and that although many of his conclusions may appear controvertible, his writing is devoid of offence. Proceeding on the assumption that mankind has sexual rights as well as sexual duties, he endeavours to ascertain the ethics of these, whether intra- or extra-marital. Prostitution and the limitation of families are, perhaps, the most important questions dealt with, and Professor Michels looks at them from the moral, not the material, standpoint. Altogether we think that the author has succeeded in speaking frankly and unobjectionably about many matters in which medical men, parents, and teachers have great concern, and that no harm can possibly come from his book, unless it falls into unsuitable hands.

Modern Anæsthesia. By J. F. W. SILK, M.D. Pp. 196. With 37 Illustrations. London: Edward Arnold. 1914. Price 3s. 6d.

THE author has discarded some of the outworn theory and practice which usually disfigures the small text-books, and included some modern work. Both processes might with advantage have been carried further, but enough has been done to place the book upon a plane above most of its size. The method of giving nitrous oxide described evidently

produces a very undesirable type of anaesthesia (see p. 68); other and better methods for dental anaesthesia exist, and might well find a place in a future edition. The book is well printed and sufficiently illustrated.

A System of Surgery. Edited by C. C. CHOYCE; Pathological Editor, MARTIN BEATTIE. In Three Volumes. Vol. III. Pp. xvi. + 901, with 276 Illustrations. London: Cassell & Co., Ltd. 1914. Price 21s. net.

WE congratulate the editors of this new *System of Surgery* on the completion of their task. With the aid of an able band of contributors they have provided an exhaustive and reliable exposition of the present-day aspects of general surgery. The various sections are so uniform in quality that it would be invidious to select any for special mention, and we must content ourselves with indicating the subjects dealt with by the different writers.

The volume now before us opens with an instructive article on the surgery of the cardio-vascular system by Mr. E. Rock Carling, who also deals with muscles and tendons in a later chapter. Mr. J. F. Dobson's chapter on the lymphatic system contains a valuable and authoritative section on the invasion of the lymphatic system in cancer which has a practical bearing on operative work. The surgery of the neck is dealt with by Mr. Arthur Edmunds, special attention being paid to the affections of the thyroid gland. The more specialised subjects—the nose and accessory sinuses (Mr. Harold Barwell), the ear, pharynx, naso-pharynx, and larynx (Dr. J. Stoddart Barr), and the direct examination of the lower air passages and oesophagus (Sir St. Clair Thomson)—are discussed in sufficient detail to meet all the requirements of the general reader, and are admirably illustrated by coloured plates as well as by figures in the text. Mr. H. Morriston Davies gives a condensed, but admirably clear, description of the surgery of the lung and pleura.

The name of Mr. James Sherren at the head of the chapter on injuries and diseases of nerves is sufficient warrant for the excellence of this section. Mr. Wilfred Trotter's contributions include the scalp, skull, and brain, and, in collaboration with Mr. Gwynne Williams, the spine and spinal cord. The chapter by Mr. D. C. L. Fitzwilliams on the jaw (*sic*) is disproportionately short, and in a subsequent edition might be amplified, the affections of the maxilla and mandible being described separately.

Mr. Choyce contributes some excellent articles on the bones and joints, including in the latter traumatic dislocations; and Mr. R. P. Rowlands deals with orthopaedic surgery. In the chapter on fractures Mr. Albert J. Walton expresses a judicial view on the vexed question of the operative treatment of recent fractures. The other sections

include affections of the skin and subcutaneous tissues by Mr. T. P. Legg, and of the bursæ by Mr. E. D. Telford.

The get-up of the work is on the high standard to which Cassell & Company have accustomed us, and a general index to the three volumes facilitates reference to their contents.

The favourable opinion we expressed of the earlier volumes is amply confirmed by that now under notice, and we can only reiterate our recommendation of the work as a whole.

The Respiratory Function of the Blood. By J. BARCROFT, M.A., B.Sc., F.R.S. Pp. x. + 320. Cambridge: University Press. 1914. Price 18s. net.

THE account of the respiratory function of the blood which Mr. Barcroft gives is, in a certain sense, limited to an exposition of his own investigations in this branch of physiology, and in setting forth either his own work or that of those who have worked with him he introduces a considerable amount of detail which gives the narrative a personal setting. His aim in writing the book is to give a connected account of the conclusions which follow from his investigations.

Since Dr. Haldane began to work at the subject over twenty years ago, much attention has been paid by English physiologists to animal respiration, and Mr. Barcroft has by his research contributed many of the results and discoveries which have been arrived at in that time.

The book cannot fail to be of great interest, and that not only to physiologists, but to all investigators who apply physiological methods in other branches of medical science.

The work is divided into three parts.

In the first the chemistry of hæmoglobin is dealt with so far as it is concerned with the carrying of oxygen. It is shown that the specific oxygen capacity of the hæmoglobin does not differ in different animals: that this capacity may be expressed as a ratio of the oxygen atoms to the iron atoms; and that while this is true for normal blood, the application of the ratio to pathological blood cannot be assumed, and must be directly investigated in the conditions of disease. The dissociation curve of hæmoglobin at different pressures of oxygen is fully discussed; the effect on this of heat: of the concentration of electrolytes in the solution: and the effect of acids and salts on the curve.

In Part II. the passage of oxygen to and from the blood is discussed in a series of chapters. In this section of the book the experiments and observations are concerned with the living tissues more directly than those dealing with the chemistry of hæmoglobin in Part I.

In discussing the call of the tissues for oxygen, it is shown that the demand for oxygen increases with increase in the activity of the tissue, and that after the tissue ceases to be active the demand is

continued for some time, and lasts until the tissue has replenished the store of energy which had been depleted by the activity. The heart, the kidney, the salivary glands, the pancreas, and the liver are examined by means of experimental tests, and all these are found to have one thing in common—when positive work is done there is a call for oxygen, to which the blood-supply responds. The call for oxygen being a fundamental fact in physiology, it may be considered as a physiological test of activity in an organ. There is, for example, a diuresis produced by injecting Ringer's solution into the blood: this is simply mechanical, and produces no work on the part of the kidney; on the other hand the diuresis produced by sodium sulphate is accompanied by a definite rise in the consumption of oxygen by the kidney tissue.

This discussion is followed by a most interesting inquiry into the regulation of the supply of oxygen to the tissues, and it is shown that dilatation of the blood-vessels is brought about by the products of activity. There is therefore increased blood-supply and increased oxygen brought automatically to the tissues in activity, and this increase continues for some time after activity ceases, that is to say, while the call for increased oxygen continues. The discussion of this automatic supply of blood and oxygen forms perhaps the most interesting section of the book. It also, because of this, leaves a certain desire on the part of the reader for further investigation. The dilatation must affect the arteries going to the gland or tissue. Where does the dilatation begin and end, and what determines its distribution? The substances which cause dilatation are due to the breaking up of protoplasmic structure during cell activity. How do these reach the arteries coming, *e.g.*, to the pancreas? They are produced in the cells, and are therefore in contact with capillaries in the first instance. These substances being in solution will pass with the lymph or with the venous blood away from the gland. How can we picture to ourselves their action on the muscular wall of the arteries?

It is all the more important to clear up this part of the subject as Mr. Barcroft points out how the observations may be extended to a study of the vascular changes in inflammation, and we would add that the absorption of these bodies would appear closely related to that of bacterial toxines, which has been the subject of so much recent experimental investigation among pathologists.

Enough has been said to indicate the value of the book. The method in which it is written and the matter it contains are full of interest. While it is not altogether an easy book to read, such difficulty as there is is due entirely to the subject.

NEW EDITIONS.

Herbal Simples Approved for Modern Uses of Cure. By W. T. FERNIE, M.D. Third Edition. Pp. xxiii. + 596. Bristol: John Wright & Co. 1914. Price 6s. 6d. net.

UNTIL we read Dr. Fernie's book, we had no idea how truly Mr. Rudyard Kipling sang, in a story of the great plague—

“Anything green that grew out of the mould
Was an excellent herb to our fathers of old.”

To those who are interested in the by-paths of medicine *Herbal Simples* will be treasure-trove. It is full of quotations, and of accounts of folk customs, relevant to the use of simples. Of the gooseberry, for instance, we read how to make gooseberry fool, and what is the derivation of “fool”; that the tender leaves eaten as a salad drive forth gravel; that the gooseberry wine wherewith the Vicar of Wakefield regaled Farmer Flamborough, “having lost neither the recipe nor the reputation,” was made of *yellow*, not *green*, berries [Oliver being a doctor would surely know]: that gooseberry shows are held annually in Lancashire, where a berry weighing thirty-seven pennyweights has been exhibited, and, being successful, disqualified from further competition by being “topped and tailed”; that in Ireland warts can be cured by pricking with a gooseberry thorn passed through a wedding ring; and that Southey's *Piularic Ode upon a Gooseberry Pie* has for refrain—

“And didst thou scratch thy tender arms, Oh, Jane! that I should dine.”

The book is full of such lore, and Dr. Fernie is to be congratulated on having written a book which, like the giant gooseberry, should be “topped and tailed,” and placed *hors concours* in its subject. He seems only to have overlooked one song bearing on simples, although it would have served admirably for his title-page. It is that from which we have already quoted—

“Excellent herbs had our fathers of old—
Excellent herbs to ease their pain—
Alexanders and Marigold,
Eyebright, Orris, and Elecampane,
Basil, Rocket, Valerian, Rue,
(Almost singing themselves they run)
Vervain, Dittany, Call-me-to-you—
Cowslip, Melilot, Rose of the Sun.
Anything green that grew out of the mould
Was an excellent herb to our fathers of old.”

And yet Dr. Fernie could prescribe all these just as easily as the rest of us could order Bland's pill or digitalis.

Appendicitis: Its History, Anatomy, Clinical Etiology, Pathology, Symptomatology, Diagnosis, Prognosis, Treatment, Technic of Operation, Complications and Sequels. By JOHN B. DEEVER, M.D., Sc.D., LL.D. Fourth Edition. Pp. viii. + 379. With 14 Illustrations. London: William Heinemann. Price 17s. 6d. net.

THE fourth edition of this well-known volume has been thoroughly revised and brought up to date. It covers a large field, and it would be difficult to discover the omission of anything of importance connected with the subject. In this edition the author admits that the relative frequency of appendicitis in the female is more common than was previously supposed. In the after-treatment of septic cases he strongly advocates saline enteroclysis by the continuous method, and much prefers it to the method of giving saline enemata every four hours. The author appears to drain his cases through the original abdominal incision, and apparently expects a fair percentage to develop a hernia. He rightly emphasises the fact that the only rational treatment for appendicitis, once a diagnosis has been made, is surgical.

Biology, General and Medical. By JOSEPH M'FARLAND, M.D. Second Edition. Pp. 457. With 160 Illustrations. Philadelphia and London: W. B. Saunders Co. 1913. Price 7s. 6d. net.

THIS handbook provides a reliable and pleasant introduction to general biological science. The subjects dealt with have been well chosen, and range from the "origin of life" to "senescence, decadence, and death." As might be expected from such a distinguished bacteriologist, the chapters on parasitism and on immunity are full of information and thoroughly up to date. The recent Mendelian researches of Wilson, Correns, Doncaster, and Bateson have been incorporated in the chapter on ontogenesis. The majority of the illustrations are reproductions of figures from the leading text-books, and are well executed.

Modern Surgery. By JOHN CHALMERS DA COSTA. 7th Edition. Pp. 1475, with 1085 Illustrations. Philadelphia and London: W. B. Saunders & Co. 1914. Price 25s. net.

It is pleasant to see this well-known manual appearing in the 7th edition, for it is among the best and most up-to-date text-books of modern surgery which we have seen. Everything which is of any importance whatsoever has been included, and each subject has been treated thoroughly. There are certain points with which we must confess we are disappointed, but in this world there is probably no such thing as a perfect book. We are most disappointed with that portion which deals with shock: Crile's is the only theory which is discussed. No mention is made of Henderson's theory, and this, in an American book, strikes us as being particularly strange. More information might be given regarding the treatment of shock, for

example; the value of pituitary extract is ignored. There is a curious error incurred to the nomenclature of the tuberculins. Old tuberculin is designated as O. T.; its proper term is T. A. Then the confusion is added to by talking about T. O. In the more modern nomenclature there is only one T. O., and that is P. T. O. or bovine tuberculin. It is surely unnecessary to enter into such details regarding the local varieties of abscess formation in that portion of the book which deals with suppuration. Special varieties of abscesses are fully considered under individual headings, and therefore there is a certain amount of redundancy in this arrangement; but with the exception of our criticism of "shock," the other points are of minor importance, and we would finally say that we can thoroughly recommend this work. The arrangement of the book is excellent. Something, however, might be done to improve the illustrations.

Manual of Bacteriology, Clinical and Applied. By B. TANNER HEWLETT, M.D., F.R.C.P., D.P.H. Fifth Edition. Pp. 668. With 98 Illustrations. London: J. & A. Churchill. 1914. Price 10s. 6d.

IN the present edition of his well-known text-book Professor Hewlett has made many alterations and additions, bringing the work thoroughly up to date. Several new staining methods have been introduced, and further details about the opsonic index and about the purification of water have been added. The account of the Wassermann reaction has been rewritten, and mention is made of the Luetin reaction and of the methods of cultivating spirochaetes. Changes have also been made in several other chapters, including those dealing with the streptococci, anthrax, typhoid, etc. The sections on the pathological yeasts and moulds have also been entirely remodelled.

The book is well illustrated, and also contains several useful tables. Numerous references to original papers are freely introduced, so that further information on any subject may be readily obtained. We can thoroughly recommend Professor's Hewlett's book to anyone, practitioner or specialist, who requires a sound account of present-day bacteriology.

Sclero-Corneal Trephining in the Operative Treatment of Glaucoma. By ROBERT HENRY ELLIOT, M.D., Lieut.-Colonel, I.M.S. Second Edition. Pp. xxvi. + 187. London: George Pulman & Sons, Ltd. 1914. Price 7s. 6d.

"BEFORE *Sclero-Corneal Trephining*," which was published in 1913, "had been eight months in print the publishers were asking for a second edition." This is sufficient evidence of the very great importance of Col. Elliot's contribution to clinical ophthalmology. In our review of the first edition we had nothing but praise to offer the

author for placing before the profession a new method of dealing with glaucoma more successfully than hitherto.

The new edition contains valuable additions to our information regarding the new operative treatment for increased tension of the eyeball. The author has carefully sifted the numerous recent contributions to the literature of the subject, the extent of the task involved being gathered from the fact that trephining alone has claimed about 500 references during the past few years. The result has been such that the issue of a second edition has practically involved the rewriting of the book. In doing so the author has spared no pains in presenting the treatment of glaucoma in all its details in an up-to-date manner. At the request of many surgeons he has greatly expanded many chapters, especially the chapter dealing with the minute details of technique, which must be of great value to every operator. We heartily congratulate Col. Elliot on this valuable addition to surgical knowledge, and have no hesitation in saying that the book should be in the hands of every ophthalmic surgeon who wishes to get the latest information on the operative treatment of this most important affection of the eye.

The Practice of Medicine. By FREDERICK TAYLOR, M.D., F.R.C.P.
Tenth Edition. Pp. xvi. + 1192. London: J. & A. Churchill.
1914. Price 18s. net.

"TAYLOR'S Medicine" is too well known to require detailed notice. The tenth edition has been revised and rearranged. Important additions include an account of the clinical applications of the string galvanometer and of the different forms of cardiac irregularity, and a series of reproductions of skiagrams illustrating diseases of the lung, and the behaviour of bismuth meals in affections of the alimentary tract.

There is a useful description of skin diseases, and even such out-of-the-way subjects as psittacosis and blastomycosis find notice. A work so comprehensive in comparatively small bulk necessarily leaves out a good deal of detail, but little of real moment has been omitted. The author contents himself in many instances with the merest indication of his preference for one of several conflicting views. His statements throughout are so judicious that we could have wished for rather more argument, but if all the points we have in view were elaborated, Dr. Taylor's book would be a very much larger one than he has meant it to be.

Genito-Urinary Diseases and Syphilis. By EDGAR G. BALLENGER, M.D.
Second Edition. Pp. xxiv. + 529. With 109 Illustrations.
London: Butterworth & Co. 1914. Price 16s. net.

THIS book opens with a description of gonorrhoea and its complications and ends with a description of syphilis. The intermediate portion is

taken up with accounts of affections of the prostate, seminal vesicles, penis, testicles, scrotum and cord, bladder and kidney. Perusal of it suggests that the author has had considerable opportunity of observing venereal disease, and we note with interest that he has, with his colleague Dr. O. F. Elder, elaborated a method whereby he has cured 750 patients of gonorrhœa within 3 to 6 days. The descriptions of genito-urinary affections, other than venereal, are of very variable merit. Many of them are short, lacking in precision and essential detail, and are apparently neither a record of personal work nor discriminating summaries of present-day knowledge of the subjects dealt with. The section dealing with tuberculosis of the kidney, for example, gives a very imperfect account of the condition in every respect, and is unworthy of a text-book specially devoted to genito-urinary surgery. We cannot recommend this book either as an introduction to the subject for students or as a guide to the practitioner in his treatment of diseases of the genito-urinary tract.

Tropical Diseases. By Sir PATRICK MANSON, G.C.M.G., M.D. Fifth Edition. Pp. xxiv. + 937. London: Cassell & Co., Ltd. 1914. Price 12s. 6d. net.

ON its first appearance in 1898 Manson's *Tropical Diseases* was at once accepted as a standard and authoritative manual, and with each successive edition its reputation has been enhanced. The fourth edition appeared in 1907, and since then there has been no thorough revision of the text. The great advances which have been made in tropical medicine during the past few years have, however, required something more than mere reprinting of the manual, hence the new edition, which has been thoroughly brought up to date by the incorporation of much new material. Among the additions which the progress of science has demanded the chief perhaps concern new work on Leishmanias: the discovery that *glossina morsitans*, and very likely other species of tsetse fly, transmit trypanosomiasis as well as *glossina palpalis*; the proof that beri-beri is a deficiency disease: the nature of yaws and its treatment by salvarsan; and the emetine treatment of dysentery, which we owe to Rogers. Pellagra, which has of late attracted so much attention, is now given a more prominent place than formerly: we note that Dr. Manson inclines to the view that it is due to a parasite, and does not discuss the suggestion recently made that, like beri-beri, it may be a deficiency disease due to want of a vitamine.

The intrinsic merits of the manual depend largely on the author's wide knowledge of tropical diseases, which enables him to bring his almost unique experience to bear on the task of sifting evidence and collating facts, and scarcely less on the extremely lucid manner in which he arranges his material. The new edition is in all respects a worthy successor to those which have gone before, and will certainly be valued as they have been.

Immunity: Methods of Diagnosis and Therapy and Their Practical Application. By Dr. JULIUS CITRON. Translated from the German and Edited by A. L. GARBAT, M.D. Second Edition. Pp. xvi. + 267. London: J. & A. Churchill. 1914. Price 14s. net.

THIS second English edition of Dr. Citron's work has been brought thoroughly up to date by various additions and alterations. In particular, a chapter has been given to reactions relating to malignant tumours, another chapter deals with the phenomena of anaphylaxis, while treatment by salvarsan and other chemo-therapeutical measures are dealt with very fully.

The book is essentially a practical one, and gives in a very lucid manner the details of the various methods of "immunity diagnosis." Dr. Citron is, we think, somewhat over-modest when he states that the book is intended for the medical student and the general practitioner, as we feel sure that research workers in immunity, and bacteriologists in general, will find the book valuable as a reference work for practical laboratory methods.

From the theoretical point of view the book deals with its subject clearly and succinctly, and on this side it is eminently suited to the needs of the medical man who is not a specialist in bacteriology.

The work of translation and the editing have been well done, and only here and there are to be found idiomatic evidences of the German original.

FOREIGN BOOKS.

Manuel de Cystoscopie. By E. PAJIN. Paris: E. Gauthier. 1914.
Price 12s. 6d.

THIS work is one of the publications of the Necker school, and a guarantee of its merit is given by the preface having been written by Professor Lequeu, who says "that it will be useful to specialists and invaluable to those who wish to begin the study of cystoscopy."

The opening chapter gives a description of the cystoscope, the next of the accessories to its use; and then the author describes the anatomy of the normal bladder, and passes to a description of the various pathological conditions which occur in that viscus. In all of this there is nothing new; but the text is so lucid, and the numerous illustrations so simple, that the study of this important branch of surgery is brought most vividly before us. Ureteral meatoscopy is described and illustrated, and the practice of ureteral catheterisation and its value is emphasised. An interesting account of renal retention (hydronephrosis) is given, and pyelography is discussed. The illustrations of this portion are especially beautiful.

We have pleasure in saying that this work is excellently done, and

that as a guide to those who wish to practise cystoscopy, in all its branches, no more satisfactory book could be used by the practitioner.

Lehrbuch der Psychiatrischen Diagnostik. By Dr. A. GREGOR. Pp. vi. + 240. With 7 Illustrations. Berlin: S. Karger. 1914. Price Mk. 5.80.

As the author states in his preface, this manual is intended as an introduction for students and practitioners to the symptoms of abnormal mental states and the diseases in which these occur. The book naturally divides itself into two parts. The first is concerned with symptoms in general, the second with the association of these symptoms in particular forms of mental disease. About half the book is devoted to each. Under the former are included all the abnormal manifestations of the individual mental faculties, as well as such disturbances of sensation and motion as are commonly associated with mental disease. It is essential that these should be systematically examined before any conclusions can be drawn regarding the nature of the disease from which the patient is suffering. The methods by which the examination is made are carefully explained, and where necessary complete details are furnished. In a most useful appendix examples are given of tests for the investigation of memory and intelligence, such as are now in use for the estimation of lesser degrees of mental defect.

As to the second half of the book the classification adopted is the modern German one, based largely on Ziehen. Schizophrenia is used as an alternative term to the dementia precox of Kraepelin. This part is quite satisfactorily done. The book as a whole may be recommended as concise and clear.

Das Ulcus Duodeni. By Dr. J. SCHRIJVER. Pp. 184. With 16 Illustrations. Berlin: S. Karger. 1914. Price Mk. 10 net.

THE publication of this work is expressive of the great interest which the subject of duodenal ulcer is now exciting on the Continent. As the author confesses, physicians and surgeons on the Continent have been slow to realise the importance and the frequency of this disease, and to British and American surgeons is due the credit for revealing its characteristics.

This book is the most complete compilation on the subject which has so far appeared. The chapters dealing with the pathology, etiology, and the explanation of the symptoms are specially good, and incorporate all the latest work on the subject. The various points are discussed in a most clear and logical manner, and the book is most readable throughout. It can be cordially recommended to all who are interested in the subject, and especially to those who desire exact information on particular points in regard to it, as the references and bibliography are most complete.

Der Salvarsan. By Dr. CARL SCHINDLER. Pp. 184. With 5 Plates.
Berlin: S. Karger. 1914. Price Mk. 4.80 net.

THAT there should be material for a book of this size on death from salvarsan injections is at first sight somewhat startling, considering how frequently and light-heartedly this drug is now administered. Dr. Schindler has all along been a strong advocate of intra-muscular as opposed to intravenous administration of salvarsan, and in this book he has marshalled all the statistics on the subject and receives undoubted support in his argument. Some thirty-two deaths have been recorded after the intravenous injection of salvarsan, but two after the intra-muscular injection of an aqueous solution and none at all following the intra-muscular injection of the oily suspension of the drug. The symptoms and post-mortem findings in the fatal cases have all been those of acute arsenical poisoning. A few cases, apparently moribund, have been saved by blood-letting and intravenous saline infusions.

Schindler strongly recommends the use of Joha's 40 per cent. salvarsan oil emulsion given intra-muscularly.

Whilst this work savours somewhat too much of special pleading it contains much valuable information, and it should be read by all those who are specially interested in the treatment of venereal disease.

NOTES ON BOOKS.

TRANSACTIONS, REPORTS, ETC.—*Transactions of the American Gynecological Society*, Vol. XXXVIII. (William J. Dorman, 1913). There are, as usual, papers of all sorts in the annual volume of the well-known American Gynecological Society. Some deal with obstetrics, some with gynecology, and some with medicine and surgery as they come into touch with either obstetrics or gynecology. For instance, Tucker Harrison, Clifton Edgar, and Edwin B. Cragin write upon uterine inertia; King, Hoffman, and Howard Taylor make their contribution upon cancer; Polak, Freund, Reynolds, and Clarence Webster discuss heart disease in connection with obstetrical and gynecological operations, and Freund specially considers the diagnostic value of the electrocardiograph; and there are articles on pituitrin, the internal secretions in fibroma molluscum gravidarum, and on iodine in the sterilisation of the skin. The volume is a handsome one, and many of the contributions to it are of more than passing interest. Dr. Henry C. Coe of New York presided over the annual meeting, which was held in Washington.

Transactions of the American Association of Genito-Urinary Surgeons, 1913, Vol. III. Although no contributions of striking originality are included in this volume of transactions, there is much that is of value bearing upon all sections of genito-urinary surgery. Mr. John H

Cunningham makes out a good case for operative treatment of acute gonorrhoeal epididymitis. The much-debated question of the antiseptic value of hexamethylenamin is ably treated by Dr. Hinman, and various aspects of prostatic surgery are dealt with by different writers. This annual contribution to the literature of genito-urinary surgery is of permanent value.

We welcome the first part of the third volume of the *Clinics of John Murphy* (W. B. Saunders Co., 1914). They are full of sound, practical points, and well repay perusal. An increasing number of "talks" by visiting members of the Mercy Hospital Clinic is included in the publication.

The second edition of *Extraction of Teeth*, by F. Coleman, M.R.C.S. (H. K. Lewis, 1914, price 3s. 6d. net), has been largely rewritten, and many new and useful illustrations have replaced old ones. The first chapter deals with the technique of extraction, and then follow chapters on complications and on anaesthesia. In these chapters we are struck by the large amount of irrelevant matter they contain, by the number of pages (nearly one-third of the book) devoted to anaesthesia, and by the absence of any definite teaching derived from the author's own experience in cases of difficulty that present a choice of methods.

ANALYTICAL REPORTS.

"SOLOID" SABOURAUD'S MEDIUM. "SOLOID" MICROSCOPIC STAIN, TOLUIDINE BLUE.

BURROUGHS WELLCOME & CO.

To their bacteriological "soloids" Messrs. Burroughs Wellcome & Co. have just added the two preparations above mentioned. Sabouraud's medium is one of the best media for growing the parasite of ringworm and similar organisms. By use of these soloids a small quantity of the medium (sufficient for ordinary purposes) can be made in about ten minutes. They are issued in tubes of six, are very convenient, and keep indefinitely. Toluidine blue is of general value as a histological and bacteriological stain; it is especially useful as a positively diagnostic stain for *B. diphtheria*.

From the same makers we have also received specimens of their new triangular bandages. These are put up in pairs, sterilised, in hermetically-sealed cartons. They occupy very little space, and are most valuable emergency dressings.

SEDOBROL.

HOTTMANN-IA-ROCHE CHEMICAL WORKS, LTD.

Sedobrol is a newly-introduced preparation of bromide, in which the sodium salt is combined with fat and extractions of vegetable proteins. When dissolved, a tablet (containing 17 grs. of bromide) forms a savoury bouillon, or, if desired, the tablets dissolved in hot water may be added to any saltless diet. The idea of combining a simple sedative such as bromide with a food preparation, so that a patient may be given the drug unawares, is novel and seems a good one; sedobrol also simplifies the use of a chlorine-free diet during a bromide course.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

KILLED in action on the 16th September. Lieut. J. LAIDLAW HUGGAN, M.B., Ch.B.(Edin.), R.A.M.C., Medical Officer, Coldstream Guards, aged 24.

Lieut. Huggan graduated in the University of Edinburgh in 1911, and after acting as House Surgeon in the Royal Infirmary, joined the Royal Army Medical Corps.

LOST with H.M.S. *Cressy*, on 22nd September, Surgeon ALFRED EDWARD TURNBULL, M.B., Ch.B.(Edin.), Royal Naval Volunteer Reserve.

Surgeon Turnbull graduated in the University of Edinburgh in 1907. He was Mackenzie Bursar in Anatomy in the University, and House Surgeon in the Royal Infirmary. He was in practice at Faringdon, Berks, and was appointed temporarily to the *Cressy* on 1st August.

LOST with H.M.S. *Aboukir*, on 22nd September, Surgeon HUGH JAMES HOPPS, M.B., Ch.B.(Edin.).

Surgeon Hopps was promoted to that rank in 1913, and joined the *Aboukir* on 14th August.

As we go to press we learn with great regret of the death of Lionel Charles Peel Ritchie, M.D. Ch.M., F.R.C.S., Assistant-Surgeon, Royal Infirmary, Edinburgh. Mr. Peel Ritchie fell from his steam launch at Granton, and was drowned before help could reach him.

Annus Academicus 1914-15.

A NEW annus academicus begins to-day. On Tuesday, 6th October, the classes in the Faculty of Medicine open, and they continue till Friday, 18th December, when the Christmas vacation begins. On Tuesday, 5th January 1915, the classes re-open, and the winter session ends on Wednesday, 17th March. The summer session opens on Tuesday, 20th April 1915, and closes on Friday, 2nd July. Graduation ceremonies in Medicine will be held on Friday, 18th December 1914, and Thursday, 15th July 1915. In our Educational Supplement particulars of the medical curriculum in the various Scottish universities and other teaching institutions will be found.

Extracts from an Educational Number of Fifty Years Ago.

THE following extracts from the educational number of a London weekly, published more than half a century ago, indicate at once how much and how little medical Edinburgh has changed in the interval:—

To anyone with a gentleman's education, a preliminary examination is by no means a terrible ordeal, though every prudent individual would make some little preparation for it. Our friend may defer this as long as he pleases, but must pass it *before* he is admitted to the first professional examination. There are two or more such examinations in the year for the convenience of the diffident.

The first ideas which will occur to the newcomer will most probably be connected with board and lodging. If he is a sensible fellow, 35s. will have taken him in great comfort from London to Edinburgh by the night mail, either by the Great Northern or Caledonian lines. He had then better hail a ticket-porter, who will wheel his luggage on a "hurley" to some hotel in Princes Street. Thence, after a bath and breakfast, he may sally out to look for a roof to cover him. Should he desire to board with a medical man, many of our profession live in houses too large for them, and take boarders at the rate of £80 to £100 a year. But the necessary arrangements are usually made before the student's arrival.

Of boarding-houses properly so called, there are several, and, of course, vary with their charges from the stained table-cloth and greasy gravy style to the hot-plate and table-napkin standard of excellence. There is, unfortunately, no collegiate residence in Edinburgh, and the majority of students live in private lodgings. In the selection of the latter, several matters which, at first sight, appear trivial should be borne in mind.

First, which side of the ravine, which divides the town into north or south divisions, should he live upon? On the latter the schools are situated, the temperature milder, and the lodgings cheaper. In Clerk Street, Keir, Rankeillor, and Lothian Streets, with several others, two rooms may be obtained, with fire, light, and attendance from 8s. to 15s. a week. Let the newcomer beware of the dirty, unwholesome kennels termed bed-closets, and rather be satisfied with one good room than a sitting-room with a cæcal appendage containing a bed, and frequently contain creatures which love darkness rather than light, and which he need not study till the second summer session. I feel satisfied that many cases of fever, and what is generally termed low health, may be referred to persons sleeping in close unwindowed rooms. The streets I have mentioned are within a few minutes' walk of the College; but a student requires exercise. Soon the days will become short, and when the "fields are dank and ways all mire," it is as well that he should be compelled to take exercise by having his residence some distance from the inevitable lecture-rooms.

In Northumberland Street, Howe, Frederick, and Castle Streets in the new town or northern part of the city, he may get good rooms for 15s. to £1 a week; the furthest is twenty minutes' walk from the schools, but with goloshes and gaiters he will soon learn to defy the elements. Compared to the rent of lodgings in London and elsewhere, Edinburgh may seem expensive, but it must be borne in mind that there is no vicarious feeding here, there is no landlady of the traditional kleptomaniac type: the Scots student's lodging

is his home, where he can get a well-served and cooked breakfast and dinner at what hour he pleases to fix upon; and the staple viands, beef, mutton, and fish, of great variety, and very cheap, are to be obtained at prices a southern housekeeper would scarcely credit. A man may live well and like a gentleman, lodging included, with as much beer as is good for him, for one pound a week. Should he prefer dining out, he can get a good cheap dinner at the Café Royal in Leith Street, or the "Rainbow," but he will increase his weekly expenditure by about one-half. . . .

If I were to be asked what are the greatest merits of the Edinburgh school, and in what respects it differs from others, I would say: 1st, In being condensed; all the lecture-rooms are near each other—a necessity in our climate. 2nd, There is perfect free trade in teaching; a student, with certain restrictions, may attend any authorised teacher. If he prefer Jones to Brown, he takes Jones's class out, and Brown says "he is very glad to hear it." Of course, the professors are older and generally more eminent men, the extra-mural lecturers are young, hard-working teachers; the former enjoy the "golden sweetness of ensured repose"; the latter are striving towards that reward their elders have merited and won. But this jumbling together of great and small, young and old, has its peculiar advantages, which are more to be observed among the taught than the teachers. If an Edinburgh man works at all (and I, who know most of them, could only name one or two who do not), he does it with a merry determination to conquer all difficulties.

. . . Why should I prefer Edinburgh for a man learning the medical profession? Why should I prefer it as a home for my son while he is preparing to fill his father's honoured shoes?

My answer to the first is, that the place is devoted to education and exercise; the coldest hearted and least enthusiastic novice must surely feel his heart beat quicker when he first walks into the old school of the Monros: if the soldier has a *batain* in his knapsack, the freshman now wandering listlessly in the quadrangle has a "chair" in his head, may be some day a professor. Then every one is learning something. "Don't bore me with your mathematics or small talk, I'm reading Syme's *Surgery*. What are you going to do this evening? Answer—*Read!*"

Now this would be very wrong elsewhere, in crowded London streets and other educational localities, but let me answer my question. Five minutes from any part of the town is time enough to walk into pure, fresh country air, as it blows over the Pentlands, or comes up raw and misty from the east. Still it is fresh air. The demonstrator, after teaching 400 students, rushes by rail to Granton for 6d., and while the blue Firth of Forth plashes its ripples at his weary feet, he is purified from the necessary impurities of his calling: so are his pupils.

Yes, my son shall study medicine in Edinburgh, and so, reader, should yours, if you wish him properly to fill his father's honoured shoes. And when you and I are both old men, or when the sod of the valley is green above us, he will keep our memory green too, and that of the dear old place:

"Where learning with his eagle eyes
Seeks Science in her coy abode."

The preliminary examination is perhaps no more terrible than it was fifty years ago, but it must be passed before the student commences his course of medical study, and is an essential to registration as a medical student.

The freshman arriving by the night mail will find that the taxi-cab has displaced the "hurley" as a means of conveyance to the Princes Street hotel—if perchance he should desire to seek shelter there. He is no longer compelled to choose between the boarding-house and solitary lodgings. Collegiate residences have been established under the aegis of the Town and Gown Association, and the claims of these excellent residential "halls" should be well considered before the stranger settles in private lodgings, although even there he need no longer fear the unwholesome bed-closet and its lively denizens. The collegiate residences have done much to add to the corporate life of the Edinburgh student, and they have a distinct educational value. In them junior and senior students gathered from many parts of the world, and, it may be, belonging to different faculties in the University, live together "in College." The interchange of experience and opinions tends to broaden the general outlook on life at a period when character is being moulded. As the members are admitted by a ballot of the residents, there is every guarantee that newcomers will be congenial. Subject to certain regulations of the Association, the members of each residence have a very free hand in managing their own affairs, an arrangement which affords an opportunity of gaining practical experience and acquiring business habits.

The Students' Union has replaced the Café Royal, the "Rainbow," and the more modern "Rutherford's," as a hostelry, and provides in addition all the advantages, social and intellectual, of a first-class club. It possesses a well-equipped library and comfortable reading-rooms.

We hope and believe that the arrangements for teaching the students of the Edinburgh school have kept pace with the social conditions provided for them. New professorships, lectureships, and laboratories have been established within the University. The Extramural School, which has played such an important part in developing and maintaining the medical reputation of Edinburgh, still flourishes, and although, moving with the times, it has undergone certain changes, it maintains its position as an integral part of the Edinburgh system. Long may it do so.

Edinburgh Post-Graduate Courses.

OWING to the War, the Committee of the Edinburgh Post-Graduate Courses were reluctantly compelled to cancel all arrangements for post graduate teaching during August and September.

Appointment.

MR. DAVID WATERSTON, M.D., F.R.C.S., has been appointed Professor of Anatomy in the University of St. Andrews.



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ON THE ATYPICAL MALE AND FEMALE SEX-ENSEMBLE (SO-CALLED HERMAPHRODITISM AND PSEUDHERMAPHRODITISM).

By D. BERRY HART, M.D., F.R.C.P.E.,

Lecturer on Midwifery and Diseases of Women, Surgeons' Hall, Edinburgh.

"Masculus intravit, foetus emersit utrumque,

Pars est una patris, cetera matris habet."

MARTIAL.

THE belief in the occasional occurrence of hermaphroditism* in the human race, although present in all ages, dates practically from Ovid's fable of Hermaphroditus, the son of Hermes and Aphrodite, with whom the nymph Salmacis fell in love so desperately that she prayed the gods to unite them in one person. This was accomplished in the fountain, as Martial has celebrated.

This poetical and transcendental idea has so dominated the lay and scientific mind that even now the question of hermaphroditism in the mammalia is discussed and supported by the description of specimens with alleged ova and spermatozoa in a common sex-gland or of those where the opposite sex-duct element is unduly represented at the expense, we shall see, of the potent normal tract. It may be noted *in limine* that the existence of the only possible form of hermaphroditism, the so-called glandular one, where an ovotestis is present, has never been demonstrated although theoretically possible.

Pseudohermaphroditism is constantly used as a descriptive term, but we cannot have a pseudo form of a non-existent condition, and it is therefore merely a convenient but misleading term for certain cases of atypical *sex-ensemble*, and is based on an erroneous idea of what constitutes sex.

The Criterion of Sex.

The only criterion of sex is the sex-gland. Abnormal development of the opposite sex-duct elements cannot be admitted as evidence of sex at all, although they have their importance as fully determining the *sex-ensemble*, typical or atypical.

In typical and atypical *sex-ensemble* cases (hermaphroditism and pseudohermaphroditism) the sex is thus either male or female.

* It would be better to adopt the French terms Hermaphrodisme and Pseudohermaphrodisme. Those used here are clumsy in comparison, and the French ones are etymologically quite correct. *Sex-ensemble* is preferable to *sex-ensemble*, as the latter is really an English-French compound.

Sex-ensemble.

What is concerned in discussing this portion is the "*sex-ensemble*," the "altogether" of *efficient* sex. We thus speak of—

(1) *The typical female sex-ensemble.*—This is made up of (a) the ovary; (b) the *potent sex-duct tract*—tubes, uterus, vagina, and external genitals; (c) the *opposite sex-duct elements*—epoöphoron, degenerated equivalent of the epididymis of the male; (d) the *secondary and congruent sexual characters*—hair distribution, pelvis, body form, vocal cords, ossification of thyroid cartilages (incomplete), and the psycho-sexual feeling for the male; mentality less strong than in male.

The typical male sex-ensemble comprises (a) descended testes; (b) vas deferens and phallus—the *potent organs*; (c) the *opposite sex-duct elements*—hydatid testis and prostatic utricle; (d) the *secondary sexual characters*—hair distribution, pelvis, body form, vocal cords, ossification of thyroid cartilages (complete); and the psycho-sexual feeling for the female; mentality stronger than in female.

A crucial point is this: In the *typical female sex-ensemble* we must have the ovary normal, the sex-duct elements (tubes, uterus, and genitals) at a maximum, the opposite sex-duct elements at a minimum, and the secondary sexual characters congruent with the sex.

On the other hand, the *typical male sex-ensemble* must have the descended testes normal, the sex-duct elements at a maximum, the opposite sex-duct elements at a minimum, and the secondary sexual characters congruent with the sex.

It is the disturbance of such relations that constitutes atypical male and female sex-ensemble—i.e. in them the sex glands are recognisable but often aplasic; the characteristic sex-duct elements are diminished, the opposite sex-duct elements increased, and the secondary sexual characters not in every respect congruent with the sex.

Classification.

It must be noted that in classifying atypical female and male *sex-ensemble* (pseudohermaphroditism) we base it only on those cases where the question of typical or atypical *sex-ensemble* arises: that is, we do not admit abnormalities not affecting the question of sex. The non-recognition of this has led former authorities to include many irrelevant conditions.

The chief modern classifications have been by Klebs, J. Y.

Simpson, Neugebauer, Menge, and a short account of these must be given before the question of one based on recent work and my own is taken up.

Sir J. Y. Simpson's classification is as follows:—

Hermaphroditism.	Spurious	In the female	{ From excessive development of the clitoris, etc.
			{ From prolapsus of the uterus.
	In the male		{ From extroversion of the urinary bladder.
			{ From adhesion of the penis to the scrotum.
	True		{ From hypospadiac fissure of the urethra, etc.
			{ Testis on the right and ovary on the left side.
		Lateral	{ Testis on the left and ovary on the right side.
	Transverse		{ External sexual organs female, internal male.
			{ External sexual organs male, internal female.
	Vertical or double		{ Ovaries and an imperfect uterus with male vesiculæ seminales and rudiments of vasa deferentia.
			{ Testicles, vasa deferentia and vesiculæ seminales with an imperfect female uterus and its appendages.
			{ Ovaries and testicles co-existing on one or both sides.

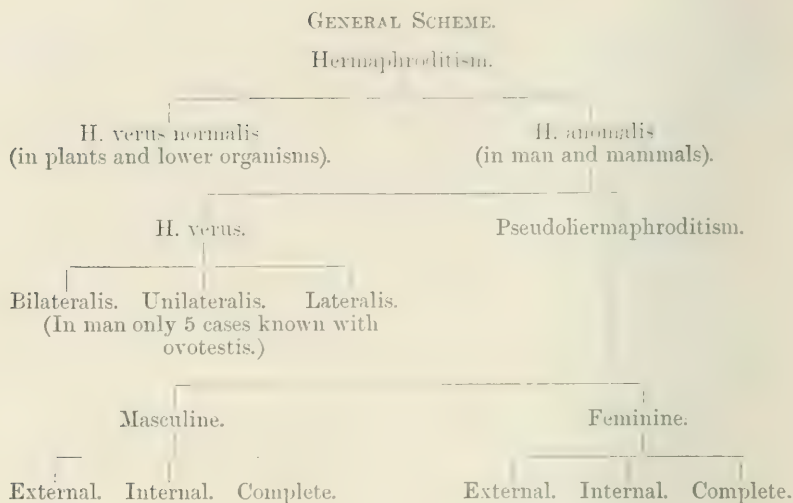
It is evident that this classification, excellent as it was at the time Simpson wrote, included many instances where no question of doubtful sex exists. Lateral and transverse conditions are based on an erroneous opinion as to what constitutes sex. The co-existence in the same individual of an ovary and testis has never been demonstrated in mammals.

Klebs' older table is as follows:—

I. Pseudohermaphroditismus feminismus.	{	A. Internus.
		B. Externus.
		C. Completus.
II. Pseudohermaphroditismus masculinus.	{	A. Internus.
		B. Externus.
		C. Completus.

This is a simpler classification, but is misleading in making other factors enter into the question of sex instead of the nature of the sex glands alone.

Neugebauer gives an excellent and comprehensive classification, but follows Klebs' in its errors.



Menge's may be given as a modern classification.

- I. Pseudohermaphroditismus masculinus.
- II. Pseudohermaphroditismus femineus.

- I. {
 - a. Glandularis.
 - b. Tuboglandularis.
 - c. Tubularis.
- II. {
 - a. Glandularis.
 - b. Glandulotubularis.
 - c. Tubularis.

The exclusion of hermaphroditism is an improvement. The division glandularis has not been demonstrated, and the tubular and glandulotubular subdivisions are misleading.

What we are really discussing at present is not atypical sex but atypical *sex-ensemble*. Sex is not atypical in any case, but either male or female, and it is the *sex-ensemble* as already defined that is atypical in what are called pseudohermaphrodites.

If one admits in evidence in judging the existence of sex, male or female, the normal duct element and the opposite sex-duct elements, then the normal human male and female are pseudohermaphrodites, inasmuch as each has opposite sex-duct elements the epoöphoron in the female, the hydatid testis and prostatic utricle in the male.

I have already shown in a previous paper* that the potent and non-potent segments in the genital tract (sex glands excepted) are to be considered as made up of Mendelian unit characters causally represented in the zygote by autonomous determinants

* *Edin. Med. Jour.*, July and August 1914.

and that the relation of these potent and non-potent segments in each *sex-ensemble*, so far as the duct elements is concerned, is a probability result, the potent being at a maximum, the non-potent at a minimum, with the secondary sexual characters congruent. The losses of segments leading to this ratio are supposed to take place at fertilisation, and to be due to polar losses at maturation, as already explained in the paper mentioned above.

In that paper I have enumerated the segments in the typical male and female *sex-ensemble* as follows, but I must amplify the former enumeration of the unit characters by adding to the female, Skene's ducts (2) and to the male, the prostate (3). The study of atypical *sex-ensemble* has shown me this clearly, and some segments must also be added for the secondary sexual characters.

Female Sex-ensemble with Enumeration of Unit Characters.

Potent.—Ovaries (2); Fallopian tubes (6); uterus (body and cervix (4); vagina, upper two-thirds (2); vagina (from urogenital sinus) (1); hymen (2); vestibule (1); larynx (1); suprarenals (4); round ligaments (2); ovarian ligaments (2); broad ligaments (2); glans clitoridis (2); prepuce (1); C. cavernosa (2); absorbing factors as to cervix, uterus, vagina, hymen (4); Skene's ducts (2).

Non-potent.—Epööphoron and ducts (4). Thus potent to non-potent 40:4.

The Secondary Sexual Characters do not lend themselves as yet to such an enumeration.

Male Sex-ensemble with Enumeration of Unit Characters.

Potent.—Testes (2); epididymes (2); vasa deferentia (6); vesiculæ seminales (4); prepuce (2); C. spongiosum (1); cc. cavernosa (2); gubernacula (4); prostate (3); suprarenals (4); larynx (1); absorbing factors in scrotum (1).

Non-potent.—Hydatid testes (2); prostatic utricle (2). Thus the potent to non-potent ratio is 32:4 in the typical male *sex-ensemble*.

In addition there are the secondary sexual characters: these do not lend themselves at present to such enumeration, but we may say that both in the male and female *sex-ensemble* they must be congruent with the sex.

These give for typical *sex-ensemble*, a sex gland, a ratio of maximum and minimum between the potent and non-potent, and a distribution of the secondary sexual characters congruent with the sex.

I now go on to show that in atypical female and male *sex-ensemble* we have (1) a sufficiently characteristic sex gland male or female; (2) an increase of the minimum at the expense of the maximum; (3) a non-congruence of the secondary sexual characteristics with the sex. I shall afterwards attempt to show that in each atypical *sex-ensemble* the result is a probability one in relation to the various segments making up the tract.

Author's Classification.

I. *Atypical Female Sex-ensemble*.—Sex glands female; opposite sex-duct elements in varying amount but not in minimum of the typical *sex-ensemble*; potent segments present but not in the maximum of the typical *sex-ensemble*; secondary sexual characteristics in some degree non-congruent.

II. *Atypical Male Sex-ensemble*.—Sex glands, testes, undescended or descended; opposite sex-duct elements in varying states of representation, but not at the minimum of the typical *sex-ensemble*; potent sex-duct elements diminished and not at the maximum of the typical male *sex-ensemble*; secondary sexual characteristics non-congruent.

CASUISTIC.

Cases illustrating the atypical female and male *sex-ensemble* must now be given, and the factors in the *sex-ensemble* in each summed up in the following classification.

With this classification as a catalogue, the Casuistic of atypical female and male sex must now be considered. This is enormous, but it is fortunate that it has been described, considered, sifted, and classified by Dr. F. L. von Neugebauer of Warsaw in a most scientific and painstaking manner in his monograph, "*Hermaphroditismus beim Menschen*," a task on his part that has rendered this part of the investigation much easier and more satisfactory than it would otherwise have been. I have also drawn on many striking works and papers by Fibiger, Tuffier, Lapointe, Cullen, Goffe, C. Martin, Tandler, Grosz, Halban, Pozzi, and many others too numerous to mention.

I have, however, in illustration of my views, merely selected cases sufficient for the purpose. I have specially to thank Mr. John Fraser and Dr. Carnegie Dickson for permission to examine and use in illustration a specimen of atypical female sex with the usual enlarged suprarenals (Pl. II, Fig. 1).

PLATE I.



FIG. 1. - Atypical female *seemingly*: Anterior view of genitals in Fibiger's Case 2. Note the apparent male hypospadias. The fundus uteri, tubes, and ovaries are seen above the pubes (Fibiger).



FIG. 2. - Diagrammatic sagittal mesial section of atypical female *seemingly*. Note the vagina ending in the prostatic sinus; the prostate and the simulated male hypospadias. There is thus in the atypical female *seemingly*, no external vaginal aperture (Fibiger).

I. ATYPICAL FEMALE SEX-ENSEMBLE.

This is rarer than the atypical male *sex-ensemble* in the proportion of 1 to 10, and is more difficult to diagnose. Indeed cases have been recorded where such individuals, although possessing uterus, ovaries, tubes, upper two-thirds of a vagina with an external hypospadiac condition like a defective male, have worked as men and lived with women as their husbands.

The best single paper on this division is by Fibiger of Copenhagen, while Somerton Clark and others have recorded cases. All these have usually been cleared up, not by clinical examination but by abdominal section or post mortem.

Neugebauer in his monograph gives statistics of such cases, and found 128 atypical female to 842 atypical male.

Fibiger gives a careful account of three atypical female *sex-ensemble* cases which he was fortunate enough to meet with in two years (1901-1903) and to examine by post mortem. I quote nearly in full the most remarkable: the two others merely need comment.

Fibiger's Case 2 (*op. cit.*, p. 9 *et seq.*) is as follows:—

N. N., *et.* 47 years, was admitted to a Copenhagen hospital, and died after being 66 days under treatment for pemphigus foliaceus and fibrinous pneumonia. The patient had enjoyed good health up till ten years before his present illness, but had not fulfilled his military service.

On *sectio* it was noted that there was a scanty full beard of thin fine hair; the hair on the pubes did not pass up towards the navel, as is usual in the male. The hair of the head was short, thin, curly, and turning grey.

The *external* genitals had a male appearance. The apparent phallus with glans and prepuce was 4 cm. long on the dorsal aspect and 3 cm. on the ventral. The prepuce was seen on the dorsal and lateral aspects of the glans, which was not completely covered by it. There was hypospadias of the second degree. The urethral cleft began at the apex of the glans and passed along the under surface to the root, where, $2\frac{1}{2}$ cm. from the apex glans it became continuous with the urethra, and a catheter could then be passed at this point into the bladder (Pl. I., Figs. 1 and 2).

Below and beneath the urethral orifice was a hair-covered area $5\frac{1}{2}$ cm. long by $4\frac{1}{2}$ cm. broad, an arched portion with a hairless mesial groove 1 to 2 cm. broad and 6 mm. deep, ending posteriorly in a slight *raphe perinei*. The arched area corresponded to a

weakly developed and small scrotum divided by the above-mentioned hairless groove.

There was no trace of a vaginal entrance, or of testes, epididymes and cords, either in the split scrotum or inguinal canal.

When, however, the abdomen was opened the true pelvis was found to contain apparently quite normal female pelvic organs (Pl. I., Fig. 1).

In the usual site there was a somewhat small uterus and normal broad ligaments, tubes, and ovaries; pouch of Douglas and vesico-uterine pouch normal, as well as the round ligaments. No trace of testes, cords, or epididymes. The apparent phallus had three corpora cavernosa. The corpus cavernosum urethrae surrounded the urethra. The bulb, mm. bulbo-cavernosi, and ligamentum suspensorium were well developed. To the bulb the membranous urethra succeeded, and then came the prostatic urethra surrounded by a *well-developed prostate, from apex to base $2\frac{1}{2}$ cm., transversely 3 cm., and in thickness at most 1 cm.*

The tissue was firm and white, with many small brown corpora amylacea. An evident middle lobe was not developed.

On the floor of the urethral mucous membrane were the small openings of prostatic tubules.

No traces of vasa deferentia, vesiculae seminales, or of Cowper's glands. On the floor of the urethra between the membranous prostatic portions a 12 mm. groove (Spalte) could be seen, covered with mucous membrane and with lateral folds. Other folds gave an appearance like the male colliculus seminalis. Bladder, trigonum Lieutaudii, and ureters normal. Through this cleft (Spalte, see above) a catheter of 4 mm. diameter could be introduced. This was the vaginal entrance, passed behind the prostate, and was bounded above by the uterus (Pl. I., Fig. 2).

The entire *vagina* was $7\frac{1}{2}$ cm. long, and from its narrowed beginning (see above) became rapidly broad, so that its periphery at the prostatic level was 5 cm., and at a higher point 9 cm. The mucous membrane was in its lower part uneven, finely granular, and wrinkled; posterior fornix shallow.

The *uterus* was $5\frac{1}{2}$ cms. long and practically normal. No trace of Gartner's canals. *Tubes* normal; small Morgagni's hydatids present; epoöphoron evident, especially on the right side. The *round and broad ligaments* normal, and no accessory suprarenals were present.

The *ovaries* puckered, and with stroma as in elderly women. Tunica albuginea present, with distinction between cortex and

PLATE II.



FIG. 1. Genital organs, kidneys and suprarenal organs, from a six weeks' infant with atypical female *seu masculinella* (female pseudo-hermaphrodite). The kidneys and suprarenals are cut externally, and each half shown. From below up: anus, labia majora, glans clitoridis, and prepuce: appearance of a male hypospadias. The fundus uteri is seen above the external genitals on the left side. The kidneys and suprarenals are above on each side. (Photograph from a collection prepared by Dr. J. B. Fraser and George Thomson.) (P).

medulla. One undoubted Graafian follicle was present in the cortex, but appearances due to atretic follicles were seen. No corpora albicantia such as follow ovulation were noted, but hyaline tissue in parts may represent these (Pl. I., Fig. 1).

Both *suprarenals* were of the usual shape, but extraordinarily large, with a breadth on section of 8 cm., length 5 cm., and a thickness of 3 cm.; after hardening in formalin they weighed 29 to 30 grms. At some parts the boundary between the cortical and medullary portions could not be made out. On the external aspect of the left suprarenal a minute accessory one could be noted (Pl. III., Fig. 1).

The condition of the other organs has no bearing on the genital condition.

The *larynx* was of the female type and with no prominent pomum Adami. Measurements are given.

The ossification type of the *thyroid cartilages* were male in type (Pl. III., Fig. 2). It may be noted here that the ossification of the thyroid cartilages is more complete in the male, and that from the larynx and thyroid cartilages Berthold diagnosed a supposed female as an atypical male. Pelvis male, except that the iliopectineal-sacroiliac measurement was female.

The *life history* of this individual was of great interest, and as follows:—

N. N. had always been considered a male and had married a woman in his 28th year. After death it was whispered that he had been "kein richtiger Mann," and his mother had said the same to her daughter-in-law. The patient stated that he had strong sexual feeling both to his wife and other women, and to his wife three children were born. On this point the widow's statement may be quoted in her own words: "Seine Witwe teilt mit, dass er häufig Kohabitationen gefordert habe, selbst noch, als (even, still, when) er während seiner letzten Krankheit zu Hause behandelt wurde.

"Sie beschuldigt ihm sogar, in intimen Verhältnis zu anderen Frauen gestanden zu haben.

"Sie gibt aber ferner zu, dass er nicht der Vater zu zweien ihrer Kinder sei, und gesteht auch endlich ein, dass auch das dritte Kind einen andern Vater haben könne, da sie vor dieser Schwangerschaft mit einem Knechte, der auf demselben Hofe diente wie ihr Mann, in sexuellen Verkehr gestanden habe (*op. cit.*, p. 17). . . . Er trank Schnaps und rauchte gern Tabak."

There was never any menstrual flow.

Case 1 is similar, but the individual was unmarried, and died of phthisis at 58. He resembled Case 2 given above, and the suprarenals were also large. The larynx was of the male type; and the pomum Adami prominent, with the ossification of the thyroid cartilages also male.

On serial section the *ovaries* (1100 sections) showed no follicles, corpora lutea, traces of hæmorrhage, or large corpora albicantia. Epööphoron present on both sides; no Gartner's canals. The pelvis was male in type.

Case 3 was that of an infant six and a half weeks old. The external genitals seemed male, and she was named accordingly. The right *suprarenal* measured longitudinally $4\frac{1}{2}$ cm.; the left, the same; corresponding breadths $3\frac{1}{2}$ cm. and $2\frac{1}{2}$ cm. There was a quite evident middle prostatic lobe. No testes, epididymes, or vasa deferentia present. For other features, see Table I. The *ovaries* measured as follows: Left, $17 \times 3 \times 6$ mm.; right, $15 \times 3 \times 3$ mm. Microscopically they were quite normal and full of primordial follicles. No Gartner's canals found.

Practically, then, these three cases were similar. In Case 2 one Graafian follicle was present, but in the infant, ova were abundant.

Cases 1 and 2 were at or about the menopause.

TABLE I.

	Body Length.	Genital Appearance.	Trunk.	Extremities.
Case No. 1 . . .	143 cm.	♂	♂	Slender and full ♀
Case No. 2 . . .	151 cm.	♂	♂	Slender and full ♀

From a study of these cases it will be seen that there was a diminution in the potent portion of the urinogenital tract, viz. in the urinogenital sinus and urethral floor, and an increase in the non-potent, viz. in the prostate.

The secondary sexual characteristics are non-congruent, as the pelvis is male in Case 1, the larynx female in Case 2. The psycho-sexual feeling was inverted in Case 2 (see Table I.).

TABLE I. (continued).

	Beard.	Penis.	Prost.	Larynx.	Mam. mae.
Case No. 1 . . .	♂	♂	♂	♀	♂
Case No. 2 . . .	♂	♂	♂	♀	♂

PLATE III.

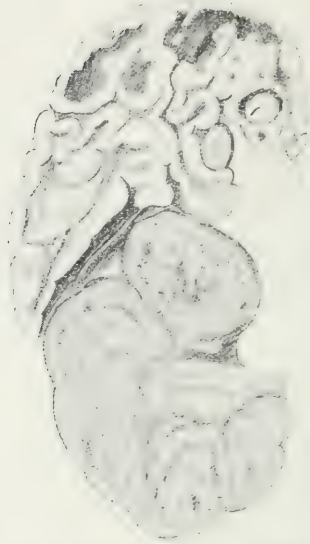


FIG. 1. —Right kidney and large suprarenal in Case III. (six and a half weeks' infant); both are seen in section and in natural size (Fibiger).

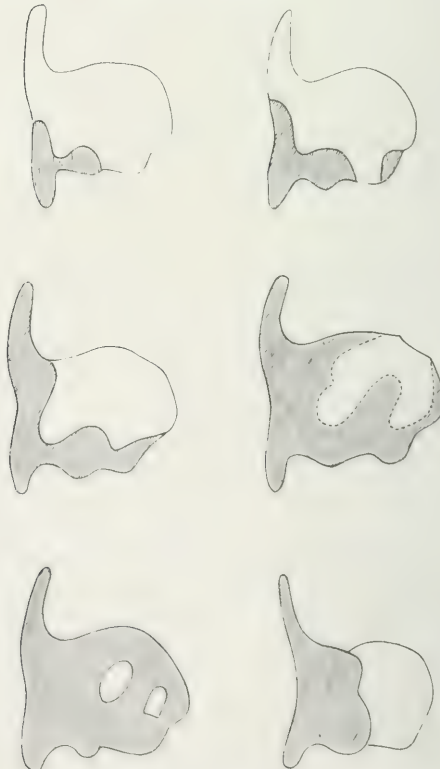


FIG. 2. —Shows stages of ossification of thyroid cartilages; lower left is male and complete; lower right, female and incomplete (Berthold, from Chievitz).

The above gives the relations of the secondary sexual characters to a limited extent. (See Pl. III., Fig. 2, for larynx ossification.)

ANATOMICAL NATURE OF FEMININE ATYPICAL SEX-ENSEMBLE.

Figures 1-4 in Fibiger show the anatomical features in such cases. The sinus portion of the vagina ends in the prostatic urethra as in the male colliculus seminalis (Pl. I., Figs. 1 and 2).

The presence of the *prostate* in atypical female sex is remarkable. In the typical female *sex-ensemble*, Skene's ducts in the urethra represent the male prostate in all probability, but in atypical female *sex-ensemble* the prostate is male in type, and is the balancing factor *re* the loss in the prostatic sinus condition, and also in the psycho-sexual attributes.

From the point of view of comparative anatomy it is to be noted that there is no prostate in monotremes and marsupials (R. Owen).

In the normal human female the prostate is represented by Skene's tubules. We may suppose that in atypical female *sex-ensemble* there is an undue distribution of a prostatic growth hormone, and they thus develop as in the normal male.

The *suprarenals* are large in all atypical cases of female *sex-ensemble*. The microscopic condition is irregular. In Cases 1 and 2 the condition was one of hyperplasia equally affecting medulla and cortex; in Case 3 the cortex was more affected than the medulla. This enlargement is not accompanied by any precocity of sexual development except in a disturbance of the hair relations. In suprarenal tumours the local sexual development is precocious, as has been shown by Glynn of Liverpool (Pl. II., Fig. 1, and Pl. III.)

II. ATYPICAL MALE SEX-ENSEMBLE (MALE PSEUDO-HERMAPHRODITISM).

The factors in the typical male *sex-ensemble* must first be recapitulated. These are: (1) *Potent*, descended testis and atrophied gubernaculum, with complete development of tubules, sperm-cells, vasa deferentia; prostate and Cowper's glands; phallus; normal suprarenals. (2) *Non-potent* or opposite sex-duct elements, hydatid testis, and prostatic utricle. (3) The secondary sexual characters are congruent, and comprise male type of pelvis, hair distribution, smallness of mammae, largeness of vocal cords and complete ossification of thyroid cartilages; psycho-sexual feeling to female.

In the normal male, therefore, the potent sex-duct elements are at a maximum of segments, the non-potent at a minimum, the secondary sexual characters congruent, and the ratio of potent to non-potent 32:4.

In the atypical male *sex-ensemble* we have this ratio disturbed owing to a greater expression of the opposite sex-duct elements or from a female type of certain structures (pelvis, larynx, etc.). Thus the testes may be undescended and like ovaries in position (Luksch's case), or descended in simulated labia majora, really split scrotum. The urogenital sinus may be present, sometimes large, may thus be considered a vagina, and has been termed the vesicula prostatica. It is really the sinus portion of the normal vagina, the normal Müllerian portion being absent. The *phallus* may be like a hypertrophied clitoris or may be like that of a juvenile male, or hypospadiac and simulate a clitoris. Where the sinus vaginae is capacious and the phallus large though defective, an atypical male may act *in coitu* as male or female, and may be potent to the female. The thyroid cartilages are more fully ossified in the normal male, and thus in some atypical male *sex-ensemble* cases the supposed female, really an atypical male, has had the real sex diagnosed by laryngoscopic examination and the use of the X-rays on the thyroid cartilages. This was done in a case by Berthold, who records a case in an individual, an apparent female, brought up and dressed as such. This case may be noted here. On laryngoscopic examination by Berthold the vocal cords (Stimm lippen) were found broad and long as in big men. The epiglottis was infantile, compressed from left to right, and the pomum Adami feebly developed. The voice was manly (Pl. III., Fig. 2).

On examination the pelvic organs were as follows:—Phallus well developed, hook-shaped, and bent downwards, imperforate, hypospadias being present: there were defective labia majora and minora. When asked as to sexual feelings the patient was puzzled, and when informed as to the true sex, "machte sie ein ganz erstauntes ungläubiges Gesicht."

A further appointment was made in order to have Virchow's opinion, but this engagement was not kept for seven years, when he turned up, and then the male nature of the larynx was fully established by examination of the thyroid cartilages (X-rays): a testis was found in a left hernial sac. Sexual inclination had declared itself, as he had "ein grosses kräftiges Mädchen zur geliebten und will sobald wie möglich heirathen." The whole diagnosis was fully confirmed by the demonstration of well-developed spermatozoa in an ejaculation.

PLATE IV.



FIG. 1.—External genitalia from case of atypical male *se-insensibilis* recorded by Martin of Birmingham. Xnis, fourchette, hymen, labia majora and minora, vestibule are seen. The testes were in the labia majora, and the individual had acted as wife.

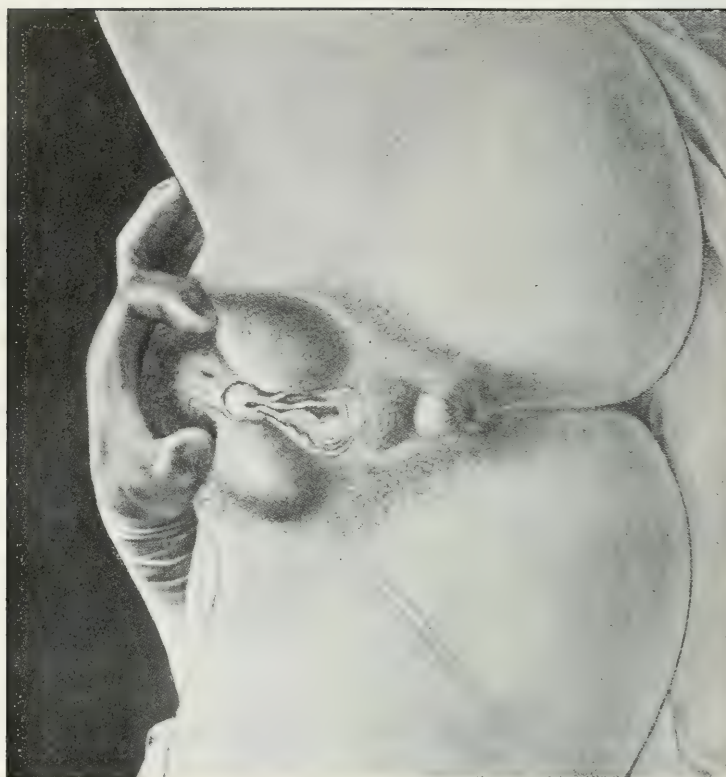


FIG. 2.—External genitalia in Tuffier and Lapointe's case of atypical male *se-insensibilis*. There is no external aperture but the medial one, and the testes are in the split scrotum.

Exact anatomical details of the condition are rare, but in some cases these have been recorded, and will now be considered along with some others where operative work was done or where the clinical examination was thorough. The illustrative cases will be taken relative to the exaggerated opposite sex-duct elements and from below up. The cases of Neugebauer, and especially one by Tuffier and Lapointe, will be studied to illustrate the inverted psycho-sexual conditions sometimes found.

CASE I.—Christopher Martin of Birmingham has recorded a case of atypical male *sex-ensemble* where the external genitals and vaginal entrance were those of a female (Pl. IV., Fig. 1), and the testes were in the inguinal canal. The clinical history is as follows:—

Mrs. P. (?), aged 44, married 20 years, consulted Martin for inguinal tumours, which on operation proved to be testes, the interstitial cells being markedly developed but the tubuli filled with a delicate connective tissue. In some of the tubuli spermatogenic cells were found. The epididymes were more or less normal. The vas deferens was traced down behind the bladder at the operation. The voice was feminine, and the patient shy and timid. The vaginal *cul-de-sac* was 1½ inches long, and hymeneal remains were noted.*

Coitus had been satisfactory on both sides. There was no representative of uterus or tubes. Here the opposite sex-duct elements unduly developed were the sinus portion of the vagina, the hymen, and the mammae. This gain was compensated by the split scrotum and the imperfect condition of the phallus and urethral floor. The psycho-sexual condition was inverted. Probably the larynx was female, but the thyroid cartilages were not X-rayed; they were evidently of opposite sex type.

In this case, therefore, the ratio disturbance affected mainly the lower ends of the duct tract, viz. urinogenital sinus, hymen; the mammae and psycho-sexual condition were also of opposite sex type. The hymen was present, as it is not a Müllerian product but an organ of the urinogenital sinus and Wolffian ducts. Although the testes were descended, the sperm-cells were defective, as I found in a case of atypical *sex-ensemble* in the pig.

CASE II.—Neugebauer records a case (*Hermaphroditismus*, p. 885) where an atypical male discharged the duties of a wife to a widower to whom she was married, where the urino-

* Carunculae myrtiformes are found after labour.

genital sinus was somewhat developed and acted as an imperfect vagina, but the spouse (?) was sexually apathetic and suffered pain on coitus. The husband was satisfied with his mate, "mit der körperlich sehr kräftigen Frau die ihm im Felde und Walde und im Hause männlich schwere Arbeit verrichtet." The details are as follows:—A. G., 172 cm. tall (5 ft. 8 in.), bones and muscles male, body and genitals hairy, hair of head short, appearance of face male, larynx and voice male type, shoulder-breadth greater than that of pelvis. Hypospadias and split scrotum present. Phallus, 6 cm. long dorsally, 5 cm. ventrally, and $5\frac{1}{2}$ cm. in circumference, that of a twelve-year-old boy, with prepuce superior and lateral only.

A vestibule was present measuring 25 mm. vertically; labia minora and majora small. A sex gland (testis) was present in each labium. Below, the urethra, vaginal entrance, and torn hymen could be made out. Into the vaginal sinus the finger passed 6 cm. No uterus and no prostate present, but possibly a rudimentary uterus and tubes. The spermatic cord could be rolled under the finger and against the horizontal ramus of the pubes.

The patient took her condition philosophically, and remarked, "Wenn sie Gott geschaffen habe, so werde kein Arzt daran etwas ändern." His reluctance to clinical display was overcome by the gift of a few roubles.

CASE III.—This case, by Leopold of Dresden, is interesting as to the existence of the urinogenital sinus. The patient, N., 46 years of age, brought up and dressed as a girl, and unmarried, wished her sex determined, as for three months she had had illicit intercourse and conducted herself as a man sexually.

N. was male in type, 174 cm. tall (5 ft. 9 in.), with much rough hair on face, rough deep voice, and genitals hair clad, with an upper convex border at the pubes. The phallus was 6 cm. long, of the usual male calibre, imperforate, and with a circular prepuce not covering the glans.

Instead of a urethra there was an open groove from the glans apex to the lowest part of the phallus root, where it widened out and opened. A catheter passed *via* this opening entered the bladder. Below this was an opening into which a catheter passed 4 to 5 cm. This canal ended blindly. There was no scrotum, but labia instead, and in them descended testes. No labia minora. There were erections now, but even *in coitu* with a well-developed girl there was no effective result, and the same was the outcome of coitus with a lad. In his seventeenth year apparent menstruation came

on every four weeks, lasting three to four days. Varices of the limbs were present since his twentieth year, and then, according to his statement, "ein Bursche mit ihr den Beischlaf häufig angeht habe welcher aber später und überhaupt bis jetzt nie wieder von einem Manne mit ihr vollzogen worden ist."

The existence of the urinogenital sinus, a canal common to both sexes, allowed of a certain amount of male intercourse and the incomplete phallus of the same, with a female, Carlyle's "problematic Chevalier d'Eon, now in petticoats, now in breeches."

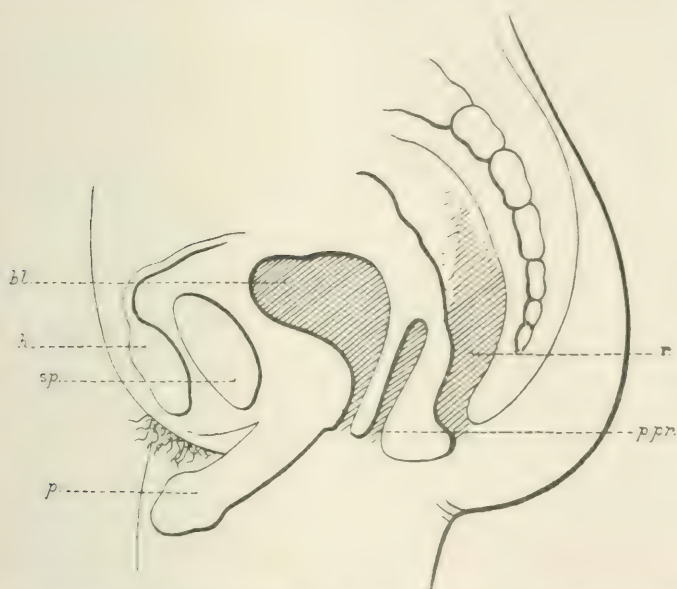


FIG. 1.—Leopold's atypical male: *bl.*, bladder; *h.*, hysteria; *sp.*, symphysis; *p.*, phallus; *p.pr.*, vesicula prostatica, urinogenital sinus; *r.*, rectum.

Leopold considered what I have called urinogenital sinus to be partly Müllerian, terming it vesicula prostatic. The prostatic utricle in the normal male represents the hymen and sinus too, and has the vasa deferentia opening in it.

This case may be regarded, then, as one of atypical male *sex-ensemble*, with the urinogenital sinus simulating a vagina, and the hypospadias the feminine external parts (text figure 1).

CASE IV.—This case, by Luksch, is of great value, as a post-mortem was obtained and a drawing of the internal organs is given. There was no hypospadias.

The patient was a plasterer's labourer, 45 years old, who died

in a lunatic asylum, where he had been placed owing to his suffering from persecution mania. The right half of the scrotum was empty, but in the left there was a hernia and also an apparent testis the size of a bean, but this was not definite, and as we shall see, not a testis. He ultimately died from general tuberculosis.

The section gave the following:—Body, 5 ft. 9 in. in height. habitus male, bony skeleton tolerably well developed, muscles feeble, hair of head thick, beard and hair on lips and cheeks.

The pubes and phallus were normally male, scrotum empty, but a hernia, as already stated, on the left side.

The prostate and caput Gallinaginis were of the usual size, and the same applies to the urethra, corpora cavernosa phalli, and the corpus cavernosum. Cowper's glands were small.

Behind the bladder, and attached to it by loose connective tissue, was an apparent uterus (*erhob sich ein uterus ähnliches Gebilde*), its fundus projecting above that of the former by 1 cm., and 10 cm. above the upper edge of the prostate. From the fundus there were two short horns to the left and right; from the horns, two Fallopian tubes, the left 11 cm., the right 7.5 cm. The uterus and tubes were defective, but details are unnecessary. It may be noted, however, that the vagina opened in the sinus pocularis as in the cases of atypical female sex (Pl. I., Fig. 2). On the left side, part of the tube, the round ligament, and the left horn were in the scrotal sac, while in the right one the round ligament and the right cornu lay.

The *sex-glands* were testes, but the tubuli seminiferi were merely thin threads. No ovaries were present. A vas deferens was present on each side, which ran on each lateral aspect of the uterus and ended in the cellular tissue of the mesometrium. On the left side it ran into the hernial sac; on the right to the neck of the sac. Above, each ended in the connective tissue of the tubes. They then pass in the line of the tubes to the testes. Vesiculæ seminales were present.

From his excellent drawing we can see that the *potent organs*, testes, vas deferens (?), vesiculæ seminales, prostate, Cowper's glands, phallus, the gubernaculum, were not functional, as the testes were undescended, and the vasa deferentia, too, were defective. The *opposite sex-duct elements* were greater than in the typical male *sex-ensemble*, as instead of the prostatic utricle and the hydatid testis there were present uterus, cornua, tubes, and vagina, although in a somewhat aplasic and malformed condition. The increase in the non-potent organs was compensated by the absence of the guber-

nacula, and by defective segments of the vasa deferentia. There was thus here a disturbance of the maximum-minimum ratio the latter being increased at the expense of the former. No psycho-sexual facts were obtained, but it must be noted that the man was insane and tubercular.

While there is this disturbed ratio it must be noted that the balancing factors are irregular in each case. The testes may be descended (often late) or undescended; the scrotum may be male or split as in the female; hypospadias may or may not be present. The psycho-sexual feeling may be inverted, apparently awaiting, or the individual may attempt sexual relations with both sexes.

These, however, are really the various results one may get in a probability distribution of the various factors making up the sex duct and psycho-sexual conditions in male and female.

CASE V.—This is recorded by Tuffier and Lapointe, and is, in its psycho-sexual aspects, a most valuable one.

Mlle. S., aged 20, consulted at the Beaujon Hospital as to the removal of a swelling in what appeared to be the left labium majus. The motive of this consultation was in view of her approaching marriage.

The clinical history was that at sixteen this swelling appeared in the left groin and gradually descended to its present position. No pain accompanied this, and the removal of the tumour was requested on aesthetic grounds. On the right the corresponding swelling was less prominent. The swellings felt like testes with epididymes, and there was no trace of hernia. No cremasteric reflex was present. The so-called Mlle. S. was thus a man.

To make the diagnosis certain, the left demi-scrotum was incised, the testis and epididymis exposed, and a piece of the testis removed for microscopical examination. Plate IV., Fig. 2, shows the actual external condition. A urethral orifice was present, but no vaginal one, and no uterus and appendages were found, but an apparent prostate could be felt.

The testis was found to be defective in structure, especially in the sperm-cells, but the interstitial cells were numerous.

The important point now comes up as to the *sex-ensemble*, and it is in it that we see the remarkable nature of the *sex-ensemble* variation and also the importance of studying such, not from the point of sex merely, but from the broader one of *sex-ensemble*. The secondary sexual parts are mainly feminine and the psycho-sexual feeling for the male; the patient is frankly an invert in this respect.

When dressed Mlle. S. seemed to be an undoubted female of graceful and attractive figure. The timbre of the voice was feminine, and the appearance of the neck, hair, shoulders, and trunk were the same. The hands, lower limbs, feet and ankles were large and male; the hips prominent and female.

The mentality was feminine, with an accurate and lively sense of all that pertains to feminine toilette, quite in contrast to one recorded by Nengebauer, where the attempted feminine attire was crude and glaringly out of taste.

The answer of Tuffier's patient to the question if he was capable of understanding the necessary transformation was: "Pourquoi ne pas m'enlever cette horrible grosseur de l'aîne gauche qui me gênerait si je voulais poser chez les peintres? Puisque vous ne pouvez rien pour moi, j'irai trouver le célèbre chirurgien D—, qui saura bien faire de moi une femme! Si j'étais comme les autres femmes, je me serais mariée et je n'aurais pas plus besoin de travailler pour vivre." As to sexual feeling his statement was: "Sans réticence, il a des désirs génésiques qu'il satisfait solitairement ou avec des hommes: jamais avec des femmes. . . . Les excitations génitales amènent l'érection de son pseudo-clitoris; elles sont suivies de sensations voluptueuses et d'éjaculations qu'il ne nous a pas été possible d'examiner au microscope. Dans ses relations génitales L. S. est franchement homo-sexual et ne cache pas son goût pour les hommes . . . a dix-huit ans, première tentative de coït comme femme, dont l'insuccès le surprit à peine 'parce que, dit-il, c'était avec un homme déjà mûr et je savais que la virginité de certaines femmes ne cède pas au premier contact.' . . . Il affirme qu'il ne s'est jamais livré à la pédérastie passive et il n'en présente aucun stigmat."

We have here, then, a remarkable variation in the atypical male *sex-ensemble*. A male by sex gland, somatically in most respects feminine—pelvis, hair distribution, mammae, trunk; in other respects male—hands, lower limbs; above all a female psycho-sexually, and thus an invert, we see here a variation result in mankind, where male and female sexual traits are so distributed that we cannot but pity this sport of the gods and fate. Truly, the probability mechanism of evolution has made mock of this man and evolved a cruel mixture of the sexually dissatisfied and unsatisfiable.

The question of DIAGNOSIS must now be taken up.

In *atypical female sex-ensemble* the diagnosis is difficult if not impossible in the *infant*. In Fibiger's case (2, p. 301) the diagnosis

was hypospadiac male, and in Carnegie Dickson and Fraser's case it was the same: yet both were females. In the *adult* the presence of the prostate and of the hypospadias misleads, and in Fibiger's Case 2 the real diagnosis was impossible. Then, again, the secondary phenomena are non-congruent, and this further complicates diagnosis. Thus the thyroid cartilage ossification may be male or female, and sexual inversion may be present.

One point must be noted, however, that bimanual examination may reveal the presence of the uterus and sex gland. In Luksch's case (p. 309) with an atypical male *sex-ensemble*, the opposite sex-duct elements were expressed as uterus and tubes, and this must be noted. The real diagnosis is thus only settled by the nature of the sex gland, and therefore an incision into the demi-serotum and removal of a piece of the sex gland for microscopical examination may be necessary. Luksch's case would have been very puzzling without a microscopical investigation, as the sex glands were in the position of ovaries, undescended.

In *atypical male sex-ensemble* the diagnosis is easier. At first sight the *infant* may appear female, especially if there is an aperture between anus and urethral orifice simulating a vaginal entrance. The split scrotum will support the diagnosis of female, but if the testes are in the demi-serotum they should be carefully palpated for the cord which can be rolled against the pubic ramus.

In the *adult* the diagnosis will be easier, especially if the testes are descended, and then the cord may be felt. When the lower part of the urinogenital sinus is present it may mislead, but it is a *cul-de-sac*, and the other features of the *sex-ensemble* should be very carefully and thoroughly examined—hairiness of body, nature of voice, ossification of thyroid cartilage, nature of mammae, of bones and muscles, and of pelvis. The psycho-sexual feeling may give aid, but it is to be remembered that it may be inverted, indifferent, or hetero-sexual (see Tuffier's case and those of Neugebauer, pp. 307 and 311).

In infants the diagnosis may be so difficult as to prevent a correct diagnosis being made. *Such cases should be brought up as boys.* The chances are ten to one that the sex gland is male, and if brought up as females they may at puberty cause scandal with the opposite sex. That such should be brought up as males was Lawson Tait's advice.

Some *miscellaneous points* may now be noted.

In *atypical female sex-ensemble* cases menstruation does not occur. In male atypical cases there is sometimes a pseudo-

menstruation, as in a case recorded by Neugebauer and others (*op. cit.*, p. 236, Hermaphroditismus).

Homo-sexuality.—This interesting, if somewhat repulsive subject is illustrated in what may be called its physiological and mental aspect by some of the cases.

Fibiger's Case 2 showed the rarer form of inversion in the female atypical *sex-ensemble*, and Neugebauer's case (p. 311) exhibited the same phase of sexuality. In both of these it was unconscious, *i.e.* they obeyed the exaggerated opposite sex psycho-sexual element distributed to them. Tuffier's and Lapointe's case shows homo-sexuality in a most pronounced form, and its cause was the evident opposite sex psycho-sexuality present. He was thus a victim of his organisation, and not a depraved personality, as may sometimes be the case. This should be kept in mind in judging unfortunates with homo-sexuality; they are cases for mental treatment by the judicious specialist, and not in the ordinary "Depart from us, ye cursed" way usually meted out to them. The whole question of the treatment, moral and punitive, of homo-sexuality is, however, most complex and unsatisfactory.

TREATMENT IN ATYPICAL SEX-ENSEMBLE.

On the whole there is no treatment. In cases of mistaken sex, usually in atypical male cases, the sex may be declared, and the necessary legal steps taken. In Croom's case, where two atypical brothers had been brought up as girls, this was done, and they went abroad. It is questionable if cases like C. Martin's and Neugebauer's (p. 307) should be interfered with, especially if up in years, and there is mutual agreement. It is not advisable to remove the sex glands, as they are important internal secreting organs, nor to amputate hypertrophied phalli.

In J. R. Goffe's case the patient was an apparent female with male hair arrangements and phallus much enlarged for a female; hypospadiac, and with an apparent rudimentary vagina. Goffe removed what seemed to be an enlarged clitoris, dilated the rudimentary vagina, and ingeniously used the mucous covering of the clitoris to re-line the sinus. The result was immediately good, but one has serious doubts as to whether the patient was not male after all. Perhaps the real nature of the case may be cleared up by a late descent of the sex glands.

In atypical female *sex-ensemble* nothing can be done. The vagina ends in the prostatic urethra, and is thus inaccessible.

The following is a summary of the view taken as to atypical *sex-ensemble*:—

1. The atypical or pseudohermaphroditic *sex-ensemble* case is either male or female, and in this is judged by the nature of the sex gland.

2. The potent, non-potent, and secondary sexual characters are not in the maximum-minimum ratio with congruence of the secondary sexual characters.

3. The non-potent in atypical *sex-ensemble* are thus increased, and the congruence of the secondary sexual characters is disturbed; this is characteristic of a probability result.

4. It is to be specially noted that in the atypical female cases a prostate with lateral lobes only (Fibiger's Cases 1 and 2), or with all the lobes (Fibiger's Case 3, an infant of six weeks), may be present.

5. In the atypical female cases the suprarenals are enlarged in all the accurately recorded cases (Fibiger's and Fraser and Dickson's), but the bearing of this in such cases is not accurately known.

6. In male atypical cases part of the lower urinogenital sinus may be present, and may thus simulate an imperfect vagina; sometimes a hymen is present, and in Christopher Martin's case the external genitals and vaginal entrance resembled those of a female in every detail.

7. Certain atypical male and female *sex-ensemble* cases may be "inverted" both in sexual feeling and in mentality.

8. In atypical male *sex-ensemble* cases the testes may be pelvic, in the groin, or completely descended into the two halves of the scrotum (Tuffier and Lapointe, Neugebauer and C. Martin).

9. In certain atypical male cases the sexual instinct may be doubly exercised.

10. In essence, such cases have this sequence developmentally —(a) Loss of parental determinants of the *sex-ensemble* at maturation; (b) the subsequent formation of *sex-ensemble* molecules with this loss when the determinants are distributed in the p. g. c. mass and p. s. c. mass; (c) in such cases the sex gland will have normal *sex-ensemble* molecules, and others unduly reduced. The latter will give rise to atypical male or female *sex-ensemble* in progeny; (d) this can be distributed again by such progeny to their offspring. (See previous paper, *Educ. Med. Jour.*, July and August, 1914, p. 106.)

11. In diagnosis the whole *sex-ensemble* must be taken into

account; above all, that of the sex gland when accessible. No diagnosis can be based on one organ of the *sur-ensemble*, e.g. on the presence of a prostate, hymen, apparent vagina, condition of larynx, or of the psycho-sexual feelings; the last may be inverted (see cases *passim*). The treatment is, as a rule, negative.

12. *An apparent vagina with labia means male sex-ensemble; in the atypical female sex-ensemble there is no external vaginal entrance, as it ends in the prostatic sinus.*

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ON PRIMARY HYPERTROPHY OF THE GUMS, AND ON
REDUPLICATION OF THE LIP.*

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PRIMARY HYPERTROPHY OF THE GUMS.

DURING a somewhat prolonged experience of general surgical work I have rarely, indeed I think only on three occasions, seen examples of that curious condition, hypertrophy of the gums. The abnormality of course must be of much greater frequency than my experience admits, for it is only very exceptionally that it leads to any discomfort, whereas it could not escape observation in the course of dental examination. It must be the dental surgeon who can speak as to its frequency. Each consultation with a dental surgeon means inspection of the mouth, while the advice of a general surgeon is sought on account of the real or supposed unsightliness of the deformity, or on account of bleeding, for the overgrowth of the gums sometimes results in that during mastication. The overgrowth is very striking. One sees at once on looking into the mouth that the crowns of the teeth are more or less embedded in a hyperplasia of what is apparently normal gum. In all of my cases the condition was bilateral and symmetrical, and more marked in the lower than in the upper jaw. The hypertrophied portions were of the firmness of normal gum; they presented no tenderness, and there was no undue tendency to bleed, though it stands to reason that when the teeth crowns are so buried in the overgrowth there must be increased liability to injury during chewing. None of my patients applied to me on account of hæmorrhage, however, but on account of the deformity. I could not satisfy myself that in any one of the cases the hypertrophy extended to the alveolar process or produced any alteration in the teeth. Besides the case of the man shown in the photograph (Fig. 1), I have seen the condition once in an adult woman and once in a female child. The overgrowth presents nothing of the nevoid character, nor is it allied to the spongy gums of scurvy, for the former is a condition characterised by a congenital softness and discoloration which is not found in ordinary hypertrophy, and the latter is merely a

* Read at a meeting of the Scottish Branch of the British Dental Association, Edinburgh, 4th April 1914.

local manifestation of a constitutional disease. Nor is there any relation between this condition and the inflammatory thickening of the gums, which is such a common and marked feature in pyorrhea alveolaris or as found in association with the deposition of tartar. I am of opinion that this form of true hypertrophy of the gums does not constitute a disease, for the condition is a congenital one, if one may use such a term, though the abnormality may not manifest itself until the eruption of the teeth.

The entity of most rare conditions is difficult to establish, and this condition is no exception to the rule. It must not be confounded with myeloma nor with naevus, nor with that rare condition, unilateral hypertrophy, which may be general or localised; but carefully excluding such conditions, there remains an overgrowth of the gums which is general, bilateral, and congenital, though only giving rise to discomfort after the eruption of the teeth, temporary and permanent alike.

In my three cases treatment was simple and absolutely efficacious. Under a general anaesthetic the knife was drawn firmly along the gum at its proper level, and the strip so marked off readily removed, first in the lower jaw, then in the upper. The wounds healed kindly and there was no recurrence. There was no necessity in any case to remove tissue from the buccal aspect but only from the labial aspect of the jaws.

It is but natural that one should turn to the work of dental surgeons for appreciation of the condition. In the Edinburgh Dental Hospital alone there are at least three casts which appear to be representative of this condition, and similar casts occur in other museums, but there is, unfortunately, in those which I have seen an absence of history of the case from which the cast had been taken. In the Odontological Section of the Royal Society of Medicine, 24th February 1913, Ironside² reports and figures the condition occurring in the mouth of a child aged 6 where the hypertrophy must have been congenital. It was not a hereditary condition, no other member of a family of five showing such an abnormality. The temporary teeth were almost entirely covered by the gum. The sex of the child is not stated. A much more elaborate paper by Frederick Sleep¹ appears in the Reports of the same section of the Society for 1911. The case he reports was that of a boy who had such marked hypertrophy of the gum and alveolar processes that the lips could not be comfortably drawn together over the protrusion. The front teeth were only exposed by removing "a strip of thickened gum from the labial surface

of the superior maxilla from canine to canine." Both jaws were affected. Photographs of the casts taken of the mouth when the patient was a boy and when later operations had been performed showed the extent of the deformity and the admirable results of surgical interference. Mr. Sleep cites other cases, but these require some investigation before accepting them as examples of this condition. The late Christopher Heath some years ago published a clinical lecture⁵ on hypertrophy of the gums. He, too, quotes cases of others, to which Sleep again refers, and Heath mentions that he had three cases under his own treatment. The extremely pronounced overgrowth, its vascularity, the way in which it altered the relations of the teeth and brought about their loosening in his first case, a man aged 26, makes it doubtful whether the condition he describes could be of the same nature as mine. He refers to the case of another man, aged 26, in whom he had seen overgrowth of the gum, but that overgrowth was restricted to a portion of the gum, and the corresponding part of the lower jaw participated. I cannot help thinking that this was one of those cases of unilateral hypertrophy which, though sometimes general, may be quite localised.⁶ Fig. 2 is a photograph of such a case, one of two which I have met with and to some extent successfully treated.

Heath's third case was a girl aged four and a half, in whom there was great enlargement, which had come on rapidly during two years. The difficulty of comparing this case with mine is obvious. Both Sleep and Heath refer to a case of Erichsen's in which he operated for removal of hypertrophied gums when the girl was two years and eight months old. This case, though cited as an affection of the gums, must be discounted altogether, for the girl's case was investigated and published with commendable fulness later on by Dr. John Murray,⁷ the title of his paper being "*On Three Peculiar Cases of Molluscum Fibrosum in Children.*" One cannot believe that cases of pure overgrowth of a normal gum such as existed in my cases should be placed in the same category with cases like Murray's, where the number of tumours occurring elsewhere, the affection of the auditory nerves and other symptoms suggest rather a disease of the nature of a neuro-fibromatosis—a disease where the first sign is but the precursor of a generalised condition. I am afraid the other cases those authors refer to are too briefly reported to make them of any value. One occurred in a mentally defective child, and no operation was performed; one in a girl aged 10 on whom successive operations appear to have

resulted in a permanent cure; and one in a girl aged 8 who had relief after operations, but who showed other congenital tendencies to tegumentary overgrowth. A casual communication made by Storer Bennett⁵ brought before the Odontological Society the case of a man aged 23 in whom "the mucous membrane of the gum in the upper and lower jaw was found to be extremely swollen, very soft and deep red in colour, but at the same time not very vascular." This had been noticed during about four months. The overgrowth "almost entirely enclosed the back teeth, and some of the front ones were very deeply embedded in it, but the gum could be pulled away right to their necks." There was some tartar, but not sufficient to account for the overgrowth. The patient was seen by Mr. Hulke and Bland Sutton, who agreed that it was similar to "lampas" in horses. This is an unfortunate analogy, for "lampas," though regarded as a definite disease by the older veterinarians, is not recognised as such by modern ones. It is considered by them to be, not a specific disease, but a symptom—a manifestation of some inflammatory condition of the gums brought about by peculiarities of food, by irritation from the bit, or from carious teeth. It may seem hard on such authorities as Hulke and Sutton to quote Williams:⁷ "Lampas, barbs, paps, etc., are terms applied by the ignorant to fancied diseases," but it accentuates the change that has come over that subject in veterinary surgery. I have no doubt that hyperplasia of the gums may occur in horses and in other animals, but "lampas" corresponds exactly to that overgrowth which in the human subject is associated with some definite cause of irritation. It is purely inflammatory, and yields to appropriate treatment. As in human, so in comparative surgery, hypertrophy is confused with inflammatory overgrowths and with neoplastic formation. Bennett repudiates the idea that the condition was "an ordinary hypertrophy of the gums," by which I take it he means an inflammatory overgrowth, and in this I quite agree with him.

Whether the condition of hypertrophy of the gums, an affection *sui generis*, is as rare as the want of literature on the subject would suggest, it is certainly an entity in which have been erroneously included other conditions, and we must make a fresh start in investigation after striking out Erichsen's case and all Heath's cases. Statements made in connection with it too must be carefully sifted. For instance, Erichsen, in referring to the condition as he encountered it, pointed out that it was apt to occur among the feeble-minded, and this has been repeated—parrot-like—by



FIG. 1.



FIG. 2.





FIG. 3.

subsequent writers. I am safe to submit that Erichsen's experience amongst feeble-minded children must have been an exceedingly limited one. I have had, during twenty-five years, exceptional opportunities for observing conditions in the feeble-minded, and though great irregularities in the eruption of the teeth and in their arrangement in the mouth and consequent irregularities of the alveolar processes and of the gums are common, I am convinced that no such hypertrophic condition can be noted as being peculiarly associated with mental defect.

I have endeavoured to describe what I believe to be a rare condition, an overgrowth of what to all intents and purposes is a normal gum in which to a greater or less extent the teeth are buried. The condition leads to no increase; the relationship of the gums to the teeth remains in the same proportion; removal is followed by no regeneration; the gums are of normal firmness and colour; and the patients have no other abnormality with which such a condition could be in etiological affinity.

REDUPLICATION OF THE LIPS.

In no way related to the above, but still of interest to both general and dental surgeons, is a curious condition of reduplication of the upper lip, not at all uncommon in a minor degree, but seldom so distinctly marked as to call for surgical interference. But three patients have applied to me on account of this condition—two adult women and one girl aged 13. The appearances are well shown in Fig. 3, though the patient had not applied for advice on account of the condition.

Like hypertrophy of the gums it is not a condition demanding surgical interference, but when it is exaggerated it may be that something requires to be done on account of the real or alleged unsightliness of the deformity, or it may be that there is really some difficulty in fitting an artificial denture should the overgrowth be unusually large. I have never seen the condition but in the upper lip, and I do not know of any record of its occurrence in the lower. The abnormality is a reduplication of the mucous portion of the lip, and the reduplication may be as large as the lip itself. At rest it may not be at all or only slightly in evidence, but during talking it becomes more obvious, and is most noticeable during smiling or singing. One of my patients intended to come out as a professional singer and insisted that the condition should be operated on, as in singing it gave the mouth such a peculiar appearance—indeed at little distance her upper lip seemed as broad as a negro's—and the knowledge that it existed interfered with her

free use of the mouth. She was thirteen years of age, and had been operated on two years previously for adenoids and had retained a somewhat "adenoid facies." She was well grown and well developed. The nose was somewhat narrow. The upper lip was short and with a tendency to eversion. The lower lip was full and presented a slight bulging on either side of the middle line, so that the centre, though withal a thick lip, was presented as a sulcus. The upper lip presented a symmetrical fullness on either side of the central segment, which made the lateral parts appear pendulous, while the central part seemed tucked up, exposing the crowns of the central incisors. Closer observation showed the pendulous parts to be the duplicated lateral segments. When she smiled the upper lip was drawn back and exposed the hypertrophied parts, which hung down over the gums and teeth in a most obvious deformity.

Another of my patients presenting reduplication of the lateral portions of the upper lip was a school teacher, and her self-consciousness of the deformity interfered slightly with her speaking and very much with her comfort, for she was always under the impression that the school children were noticing and remarking the peculiarity. There is certainly a neurotic element in these cases, but an element which cannot be ignored when it interferes with the patient's ability to earn her livelihood.

In development the upper lip is not the simple bilateral structure of the lower. It is indeed composed of three segments—a central and two lateral. In the formation of the embryo the former is evolved from the mesial nasal process and each lateral part of the lip from each maxillary process. It would be surprising, therefore, if we were to find a hypertrophy involving all these three parts, and as a matter of fact this is not found. The central part yields peculiarities apart from the lateral portions. If in the former there is a thickening of the mucous part below the philtrum, it produces a peculiar strawberry-like prominence, but only of that part of the upper lip which is derived from the mesial nasal process. If, however, reduplication occurs in the parts formed from the maxillary processes, we have the symmetrical arrangement referred to, and in this the entire upper lip participates except its central segment. This is in accordance with our knowledge of embryological data, and is what one would expect. The red part of the lip is reduplicated by what is practically a second mucous lip lying between the true lip and the gum. It fills up the alveolo-labial sulcus and gives a curious appearance—as if the person had two lips on the upper jaw, one behind the other.

I do not think there is anything with which this condition can be confounded. The reduplication retains absolutely the aspect of the normal lip. It is impossible to conceive a nevus which would appear symmetrically in the two lateral portions of the lip and yet allow the central part to escape. Nor has the reduplication the colour of a nevus, but of the normal mucous lip. There is, it is true, a condition which may be mentioned in connection with the reduplication, though it has indeed little similarity and its etiology is quite obvious. This condition is inflammatory in origin, and forms a ridge of mucous membrane in the sulcus, firm and infiltrated, and obviously the result of irritation. I have seen it on several occasions, in each of which it appeared to be due to an ill-fitting upper denture, where the outer margin of the alveolar part of the denture, the artificial vulcanite gum, had ulcerated into and caused irritation of the alveolo-labial sulcus. Each case occurred in that class of society which patronises unqualified dental practitioners, and the teeth having been prematurely extracted an artificial denture had been fitted long before the alveolus had undergone its normal and proper absorption. The natural result followed, that as the alveolus was absorbed, the artificial denture became loose and cut into the sulcus, producing an inflammatory reaction and the production of a characteristic ridge. I have on at least two occasions removed this ridge, and there has been no recurrence after properly-fitting dentures had been applied.

The operative results of plastic surgery are here satisfactory. There is no difficulty about the excision of the redundancy, but one must mark off with the knife the part to be excised while the lip is at rest, for the limits and extent of the deformity are obscured the moment the lip is drawn into an abnormal position. A general anæsthetic is best employed, but local infiltration might be made at a distance from the affected areas.

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THE PASSING OF VESALIUS.

BY G. MATHESON CULLEN, M.D., B.Sc.

I.

THE mists and shadows of three and a half centuries have so gathered round the figure and fame of Vesalius that the events of his life and the grandeur of his achievement have become almost lost to the mental vision of the present generation. The near approach of the fourth centenary of his birth and the celebrations with which his fellow-countrymen intend to mark it, will, it is hoped, rescue his name from the undeserved oblivion into which it has fallen, and place in enduring light the extraordinary work he accomplished, and the extent of the debt which anatomy must for ever owe him.

It is not necessary, therefore, to attempt here the rehabilitation of the fame of Vesalius or to anticipate the more authoritative exposition of his rank as a pioneer of science. The month of October 1914, however, marks the 350th anniversary of his death, and naturally directs attention to the circumstances connected with that event. There is this further excuse for investigating the last phase of his life, since it is so curiously tinged with romance and so shadowed by the mysterious, that in most of the ordinary works of reference it monopolises whatever little space is allotted to his career. Notwithstanding this undue attention it is safe to say that in almost every case the account given is misleading where it is not altogether erroneous. This is not surprising, however, in view of the divergent statements made by the contemporaries of Vesalius. So great are their apparent discrepancies that Roth,¹ to whom we are indebted for the only complete biography of the anatomist, declares it to be bootless to try to reconcile them. On the ground that none of the writers were eyewitnesses of the events narrated he dismisses them all as unworthy of credence. But to set up ocular and personal evidence as the only criterion of historical verity is to raise up an almost impossible standard which, even when it is attained, does not always ensure the truth. Leaving Roth, therefore, on the arid summits of his higher criticism, it is the purpose of this paper to make a minute examination of the original sources of information and an impartial appreciation of the value that may be assigned to each authority. To this end we shall listen attentively to every tale we are told, investigate the character and test the *bona fides* of each narrator, bring the



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related incidents into comparison with well-ascertained facts, and rigorously prune away whatever is obviously mere surmise or deduction. And at the present moment, when we experience the difficulty of reading the real facts from the blood-stained pages of the latest chapter in the history of Belgium, there is a certain sad appropriateness in an endeavour to get at the truth in regard to the tragic fate of one of her most illustrious sons.

To begin, then, we must focus our attention upon the year 1564. Almost a generation has elapsed since Vesalius had published his epoch-making *De Humani Corporis Fabrica*, and had cut himself off from the teaching of anatomy by becoming the physician of Charles V. On the abdication of the latter in 1555 he had passed into the service of his son and successor Philip II., carrying with him a life pension as a token of the esteem of his old master. It is five years since he had, along with his wife and daughter, followed Philip into Spain. During his residence at the Spanish Court his professional reputation had become greatly enhanced, and he had acquired a considerable fortune. There was absolutely nothing to suggest that he would not live and die in the office he held. Suddenly we learn from Francis di Francisci² (24th May 1564) not merely that Vesalius had left Spain but that he had lately visited him at his printing-office in Venice and had thence set out for Jerusalem. More than six months pass without any further information regarding him, and when the curtain again rises it is upon the end of the tragedy and the death of the protagonist. The first intimation comes from Brussels, whence Pierre Bordey writes³ (4th December 1564) his master, Cardinal de Granvelle, that Vesalius had died of a catarrh in a town (unnamed) of Greece, and that the news had been brought to his widow, then resident in Brussels, by certain pilgrims who had buried him. These two facts, which stand upon the threshold, also indicate the scope of the inquiry which is to determine (1) what were the circumstances that preceded and led up to his departure from Madrid; and (2) what happened in the interval between that event and his death.

PART I.—WHY DID VESALIUS LEAVE MADRID?

From all accounts Vesalius held an envied place in Spain. Singularly favoured by the high opinion in which he stood with Philip, his services were eagerly sought after by the rich nobles of the most opulent Court in Europe. Wealth, honour, influence, the esteem of his medical colleagues in Spain, everything, in short, that ambition could desire or success obtain, was his. It is little

wonder, then, that the world was astonished, and speculation grew rife when the news spread that he had left the delectable city behind him and had undertaken a journey notoriously dangerous and in his case fatal. We are thus prepared to expect some variety of views as to the motives which had prompted his departure. This anticipation is more than justified by the diversity of opinions expressed. To some his departure from Madrid was not directly associated with the journey to Jerusalem. Thus it was alleged—*(a)* that he resigned his post because he was tired of his life at Court and wished to get back to Belgium; or *(b)* that he was dismissed or forced to resign owing to the successful intrigues of the Galenists against him; or *(c)* that he left because he was anxious to resume his career as an anatomist. To others the two events were intimately connected, and so it was asserted that the journey was undertaken *(d)* to extend his knowledge by travel in the East; or *(e)* to win a bet; or *(f)* in fulfilment of a vow; or *(g)* as a specious pretext for getting away from Spain or *(h)* from his nagging wife; or *(i)* because he had been condemned to do so by the Inquisition. In the endeavour to unravel this remarkable tangle of testimony we shall begin with the story which was apparently first in order of time and is extremely important because of the almost universal credit which has been given to it. We refer to

THE VERSION OF LANGUETUS.

This is stated to have been written by Hubert Languetus in Paris on the 1st of January 1565, and to have formed part of a letter addressed by him to his intimate friend the physician Caspar Peucer, son-in-law of Melancthon. It is to the following effect:—"There is a rumour that Vesalius is dead. Doubtless you have already heard that he had set out for Jerusalem, but I have received information from Spain that there is a wonderful reason for that pilgrimage. A certain nobleman in Spain who was sick had been committed to his care. After the death of the latter, Vesalius, who was not satisfied as to the origin of the illness, asked the relatives' permission to open the body. The request was granted, but on opening the breast the heart was found to be still beating. Thereupon the relations, not content with accusing him of murder, denounced him also to the Inquisition on the score of impiety, thinking that in this manner they would be more thoroughly revenged on him. When the facts of the case were known, the error of the great physician could not easily be excused,

and the Inquisition determined to condemn him to death. It was with difficulty that the authority, or rather the prayers, of the King rescued him from this danger. At length the tribunal gave way to the entreaties of the King, and indeed of the whole Court, but only on the condition that he would expiate his crime by going to Jerusalem and Mount Sinai."⁴

Such is the tale of Languetus, and he might well call it a wonderful one, which, as it shadows forth the inexorable march of destiny, follows the lines of a Greek tragedy. The irony of fate which caught the physician in the snare of the science he had created, and dragged him from out that fierce light which beats around a throne to cast him into the loathsome darkness of a dungeon; the dreadful spectre of the Inquisition bent on hurrying the distinguished victim to its baleful fires; the cruel mockery of the pardon, which was only a brief postponement of the death sentence—the whole picture is one that could not fail to make a permanent impression on the mind. The effect has indeed lasted almost unimpaired up to the present day, for it is the only version given in the latest edition of the *Encyclopædia Britannica*,⁵ and in a recent (1910) biography of Vesalius published in America.⁶

It is necessary, however, to discount entirely this general acceptance of the story, and to examine it solely in the light of contemporary facts. As a preface to this investigation, the history of the tale itself is of some interest. Although Languetus is said to have written it in 1565, not a solitary whisper was heard in regard to it till it appeared in Melchior Adam's book, *Vita Germanorum Medicorum*, published in 1620. In his *Life of Vesalius*, Adam begins by relating another account, to which reference will be made later; he then proceeds to give that of Languetus, about which he clearly had some doubts. Subsequent biographers in the seventeenth century were not more impressed than Adam had been. In 1725, however, the story leaped into prominence, and thereafter practically held the field alone. This was due to the fact that it was accepted by Boerhaave and Albinus, and appeared in the biography⁷ which forms the introduction to their edition of the *Opera Omnia* of Vesalius. These authors do not even hint that any other explanation existed, and set forth the details with the simple directness of men who are relating the universally acknowledged truth. The undoubted merit of their edition and its widespread dissemination made it a standard work of reference, and so the version of Languetus

became known and accepted to the exclusion of all others. It is certain also that the character of Languetus had considerable weight in determining belief in a story which was said to be vouched for by him.

The extremely interesting career^s of this gifted politician and author cannot be detailed here. A few facts must suffice. Born in Burgundy in 1518, his keen intellect rapidly acquired in full measure the knowledge of his day. At an early age his religious views became unsettled, but at a later date he fell under the spell of Melanchthon, and adopted his opinions. From a curious similarity of temperament there sprang up between them an intensity of affection which nothing could satisfy short of actual reception into the reformer's family circle. Even after the death of the latter, and when he himself had entered upon a diplomatist's career, he always looked upon Melanchthon's house in Wittenberg as his home. Like his adopted father, he, too, had the personal charm which endeared him to all he met. Among his intimates we find such distinguished names as Ambrose Paré, Thuanus, Clusius, George Buchanan, and Jean Dorat. His close friendship with Sir Philip Sydney is well known, and their correspondence has been several times issued in an English dress. It was in the service of the Elector of Saxony that he first entered upon diplomatic work, but he afterwards went to the Count Palatine, and in 1578 joined William the Silent, Prince of Orange, for whom he had always felt a great admiration. In spite of the prejudice of his calling he was a man of singularly open mind, and he had so scrupulous a regard for the truth that he would not tell a lie even in jest.

From all this it follows that the word of Languetus may be accepted without hesitation in respect of everything that came under his personal observation. It will be noticed, however, that in the story about Vesalius he merely repeats a tale he has heard. He does not even give the name of his informant. The preface to his remarks is the vague phrase—"*Ad me ex Hispania est per-scriptum.*" Moreover, the rest of his letter has disappeared, and there is no means of knowing what was his own opinion about the news he retails. It is clear, therefore, that Languetus cannot be regarded as an authority for the tale. The authenticity of it must be established on other grounds.

The story, as we have it, really consists of two parts which have no necessary connection: first, the vivisection, and, secondly, the intervention of the Inquisition. In regard to the vivisection,

there is only one other contemporary who seems to refer to it. This is none other than the famous surgeon Ambrose Paré, who in his book *De la Génération*, published in 1571, speaks thus: "On this account the body should not be hurriedly buried, still less opened, for fear of incurring the blame that befel in this century a great anatomist, yea, a grand and celebrated anatomist whose works have to-day restored learning. He, being then resident in Spain, was called upon to open the body of a woman of quality who was thought to have died of a suffocation of the womb. Lo, at the second stroke of the razor the woman began to move and to show by other signs that she was still alive. The reader may guess how perplexed the anatomist was thereat, and how the people cried out, 'Away with him.' The best he could do was to leave the country, for those who ought to have excused him were those who ran him down. Being exiled in this fashion, he died of grief shortly after, to the great loss of the commonwealth."⁹

Such is Paré's account, and though it differs from that of Languetus, both agree in accepting the vivisection as a fact. At the most, however, they merely point to the presence of some vague rumour in regard to Vesalius. The total absence of any other reference to such a remarkable event shows that the rumour was generally regarded as without foundation. It is not necessary, therefore, to enlarge upon the antecedent improbability that a man of his experience would make such a fatal mistake. He is not, indeed, the only physician against whom such an imputation has been made. The deaths of the Cardinals Espinosa and Richelieu, as well as that of the famous Abbé Prévost, have been popularly attributed to a similar cause, but in no instance has the charge been substantiated. The general trend of the rumour regarding Vesalius was not, however, that he opened a living body by mistake, but that of set purpose and in the fiendish pursuit of knowledge he dissected the living. In 1599 Andrew Laurentius records this as a fact, and adds an indignant protest—"Sed impium hoc et plane inhumanum iudico, nec ullo modo necessarium."¹⁰ The same charge was brought against Jacobi da Carpi and Fallopius, and found support even in the nineteenth century by such men as Littré, Burgræve, and Malgaigne. Roth,¹¹ however, has finally disposed of the matter, clearly proving that the opinion was based upon a mistaken interpretation of the documents. It is possible that Vesalius may have given occasion for the slander by the well-known passage¹² of his *Anatomy*, where he refers to his

examination of a still beating heart. It would appear that he himself recognised the dangerous imputation which this brief statement might give rise to, for in the second edition he adds that the organ had been removed by the common executioner from a criminal who had incurred the barbarous punishment of disembowelling.

We now pass to the second head of the indictment, viz., the action of the Inquisition. Here Languetus stands absolutely alone. Paré, who supports him in regard to the involuntary vivisection, here deserts him. Yet this conspiracy of silence is extremely remarkable in view of the circumstances of the time. The fierce animosity consequent upon the Reformation had ended by dividing Germany into two armed camps. Political and religious differences were at that moment rending France, and had initiated in the Netherlands the bloody contest which was to wrest that country from the Spanish crown. Controversy is always coloured by the character of the men who engage in it, by the violence of their feelings, and by the importance of the issue involved. But the polemics of that day were bitter and reckless and envenomed to a degree that can scarcely be imagined now. The Spanish Inquisition in a particular manner excited the fear and loathing of Protestants, and Motley is certainly right in making it the principal factor in precipitating the war in the Low Countries. It is therefore inconceivable that such a charge against the Inquisition would not have found its way into the copious controversial literature of the period. Several of the relations and friends of Vesalius were on the side opposing Spain. His widow re-married, and Philip van der Meeren,¹³ the brother of her second husband, was a most devoted partisan of William of Orange. Such people must have known the facts, and had the Inquisition acted in the way alleged they would be the last to keep silent about it. Moreover, it was the duty of Languetus, as the accredited agent of Augustus, Elector of Saxony, the recognised head of Protestantism on the Continent, to make his master acquainted with the news, and that prince would have taken care to spread it far and wide. But it was not to Augustus but to Peucer at Wittenberg that the letter is said to have been addressed: to Peucer, who was himself to suffer at a later date under a Saxon Inquisition and be imprisoned for twelve years because his Protestantism differed from that of the Elector. Now from the time of the Reformation Wittenberg had been regarded as the headquarters of Protestantism, and after the death of Melancthon in 1560 the chiefs of the various parties

kept up their correspondence with the town through Peucer, his son-in-law. Had the latter received the letter it is impossible to imagine why he kept this spicy piece of information from his friends. Languetius himself was a copious letter writer. His published correspondence covers the period of which we are speaking; indeed it contains a long, chatty epistle¹⁴ to Mordeisen, dated 1st January 1565—the very day of the alleged letter to Peucer. Neither here nor anywhere else does he refer to the "*causa mirabilis*." Pantaleon, Bizaro, Thuanus, and Clusius, each of whom has contributed a biography of Vesalius, were among his closest friends. The anatomist was thus a subject of common interest to them all, but Languetius was silent even in this intimate circle. Certainly the others have not a word to say about the vivisection or the Inquisition.

So far we have been more especially referring to those who were the enemies of Spain or to Protestants, who would have a very natural bias towards accepting the story and spreading it. But the absolute silence of the Spanish authorities is no less significant. Charles Clusius, the botanist, arrived in Madrid a few days after Vesalius had left, and he obtained from De Tisnacq a detailed account of his departure but not a syllable about the Inquisition. Charles de Tisnacq, who had been a near neighbour of Vesalius when both lived in Brussels, was at this time a highly placed Court official, the President of the Council of the Netherlands at Madrid. He was obviously in an excellent position to have accurate information. Few will be so prejudiced as to hold with Charles Kingsley¹⁵ that De Tisnacq deliberately lied to Clusius. The English author is so convinced of the inherent iniquity of the Inquisition that he will believe in its intervention at all costs. But his far-fetched assumption, even if granted, only removes one witness. Such an extraordinary event in regard to a well-known member of the Court could not escape notice and comment. Why should the friends of the murdered man (or woman) be silent on the matter? Why should the nobles who were so distressed at the imprisonment of their fellow courtier not express their satisfaction at the success of their efforts for his liberation? Like all in high places, the physician had probably enemies in Spain. The Inquisition had certainly many. How was the silence of this multitude bought? How has this marvellous occurrence failed to find any place in the private letters, state documents, or diplomatic correspondence of the time?

Last of all we come to the Inquisition itself. It is well known

to have been the usual procedure of this tribunal to give the utmost publicity to its judgments and to impress the imagination of the people by the awful solemnity of the *auto-da-fé*. Those of its victims who escaped the death sentence and were condemned to minor punishments were forced to take their part in the dreadful pageant. The higher the rank of the offender the greater the care taken to make him figure prominently in the procession. The case of a man such as Vesalius would have been duly published even if he were spared the indignity of the *auto*. Moreover, although the Inquisition conducted its examinations in secret, it must be remembered that it carefully followed the judicial forms of the period and kept detailed minutes of its proceedings. All these records were thoroughly investigated by the unfriendly eye of Llorente.¹⁶ Whatever may be said of the accuracy of this historian this much is certain, that no one has had such an opportunity of examining all the documents and no one would be less likely to hide its delinquencies. In his long list of distinguished victims of the Inquisition the name of Vesalius does not appear, and subsequent gleaners in the same field have with all their care failed to find any mention of him.

We are now in a position to estimate the historical value of the story. Languetus gets it from some unknown correspondent in Spain; his own opinion about it is not recorded, but he does not appear to have repeated it again. If Peucer actually received the letter he exercised a like reticence. No other contemporary, Catholic or Protestant, in Spain or elsewhere, ever heard of it. The accounts they give of the departure of Vesalius completely ignore it. From what has been already stated this universal silence in regard to an occurrence which from so many different points of view clamoured for record and comment, can have only one explanation, viz., that the event did not as a matter of fact take place. It is right to add that the ridiculous nature of the tale was pointed out so long ago as 1728 by the judicious Nicéron,¹⁷ and that the three most competent authorities on the life of Vesalius, Burggraefe,¹⁸ Roth and Wauters,¹⁹ do not credit it. The disappearance of the original letter, the long delay in the publication of the excerpt—fifty-six years after the death of Vesalius and thirty-nine after that of Languetus—and all the other circumstances of the case, lead to the conclusion that the story is a forgery fathered upon Languetus.

THE VERSION OF METELLUS.

Of a quite different character, utterly wanting in romance and sordid to a degree, is the version of Johannes Metellus. It is contained in a letter written by him at Cologne on the seventeenth of the calends of May 1565, and addressed to the great expounder of a *via media* in religion, George Cassander. "Vesalius for a wager, and that he might get more wealth, set out last year from Spain for Jerusalem."²⁰

Metellus, like Languetius, was a Burgundian, but unlike the latter he remained at least nominally a Catholic, though his views and his sympathies approximated very closely to those of the Reformers. He does not quote any authority for his statement, and it is not possible to trace its exact source. In any case the story need not detain us, for there is not another reference to the wager in contemporary literature. The letter itself, which has somehow escaped the lynx eye of Roth, was not printed till 1617. The version bears its refutation on the face of it, but it is not necessary to imagine that the author invented it. Probably Metellus merely retailed a variant and expansion of a rumour undoubtedly current at the time, and which was to the effect that Vesalius had grown avaricious and would do anything for money. The origin of this rumour will be dealt with later.

THE VERSION OF ARGENTARIUS.

The suggestion that the royal physician was dismissed from his office or forced to resign it in consequence of the campaign of slander carried on against him by the Galenists, rests upon the unsupported authority of Joannes Argentarius. This brilliant reformer of medicine, the Broussaïs of the sixteenth century, spent his whole life fighting Galen. In the preface to his collected works he sums up the lessons of his own career and naturally lays stress on the hardships that are the lot of the innovator. Among other examples he mentions Vesalius. "Was not Vesalius," he says, "driven from his attendance on the Royal Family for this very reason that he wrote against Galen? And yet he was a man who ought to have been loved rather than hated if indeed we were open to the evidence of our senses and not overborne by preconceived opinion, or if we regarded the greatness of the benefit which his divine work on anatomy conferred not merely on our art but on mankind in general."²¹

The anger of the professors of the old school against Vesalius was, we know, unbounded. It led Sylvius to refer to him as

Vesanus (madman), and he loudly called upon the Emperor "to take means that this monster of ignorance, this most hurtful example of ingratitude and impiety, may be heavily punished and in every way restrained, lest by his pestilent breath he poison the rest of Europe."²² But we also know that Charles V. was quite unmoved by this campaign of slander, and that on his abdication he marked his continued esteem of his physician by conferring on him a pension.²³ All available information goes to show that Vesalius held an equally high place in the regard of Philip II. and retained his confidence to the end. Moreover, in the fierce and prolonged fight between the Antients and the Moderns the dismissal of Vesalius could not have been overlooked. The former would have shouted joyfully over such a triumph for them, while the indignation of the latter would have found more general expression than in this solitary voice raised at so late a date as 1607.

OTHER VERSIONS.

"Having grown tired of office since he could not accommodate himself to Spanish customs, he would have retired to his own country, but the King would not allow him. Under the restraint his health broke down and was with difficulty restored. Upon his recovery he again asked the King to let him go, since he had vowed to make a pilgrimage to Jerusalem if he got better. The King not only gave permission, but also furnished him with a signed letter, allowing him to leave the country in whatever way he wished, and forbidding the frontier officials to place any obstacle in his way. A certain sum of money was also granted by the letter to cover the expenses of himself and his wife on the journey." (Clusius, 1564.²⁴)

Vesalius "determined to set out for Jerusalem for the purpose of seeing the holy places, and in order to investigate certain recondite questions." (Pantaleon, 1565.²⁵)

"Vesalius never was exiled nor was the matter which Paré hints at the cause of his pilgrimage to the tomb of Christ. The reason was a religious vow." (Dudith, 1582.²⁶)

"(He died when) returning from a pilgrimage to Jerusalem." (Zuinger, 1586.²⁷)

"The renowned Vesalius for his soul's sake set out along with Jacopo Malatesta . . . for Cyprus." (Thuanus, 1606.²⁸)

"At length, weary of life at court, and prompted by the desire of seeing Palestine as well as by religious motives, he set out . . . for Cyprus and thence to Jerusalem." (Miraëus, 1609.²⁹)

"As things were not going on in accordance with his desires, he turned away from the turmoil of the Court, resigned his post and went on a journey to Jerusalem and the holy places." (Castellano, 1618.³⁰)

"At length, weary of life at Court, and prompted by the desire of seeing Palestine, as well as by religious motives, and also because he burned with the passion for investigating the mysteries of nature in far-off places, he set out for Cyprus . . . and thence to Jerusalem." (Melchior Adam, 1620.³¹)

In a letter written in May 1566 (first printed in 1722), Reinerus Solenander³² speaks in almost identical terms to those of Clusius, but he doubts the sincerity of the vow, as he did not believe that Vesalius was a religious man. He also states that he separated from his wife in a temper.

"At length, weary of his life at Court and of the brawlings of his wife, and drawn by religious motives and by the desire of seeing Palestine . . . he set out for Cyprus, and thence to Jerusalem." (Sweertius, 1628.³³)

This exhausts the list of references to the departure of Vesalius, up to 1628. It now remains to inquire what degree of credibility attaches to each writer, and how far he was in a position to know the circumstances of which he speaks.

Clusius was himself a Belgian, and his statement was prompted by seeing the account of Vesalius which Thuanus had incorporated in his *Historia*. He at once (28th January 1607) wrote the latter: "J'ay observé que vous avez esté mal informé de la façon de la mort de Wesalius: lequel partit d'Espagne pour faire son voyage de Jérusalem quasi en même temps comme j'y entray. Je vous avertiray avec plus de loisir comme son dit voyage s'est passé."³⁴ In fulfilment of this promise, he at a later date forwarded his account, which is so detailed that it is evident that he must have been writing from notes made at the time, otherwise the circumstances could not have been so fresh in his memory after a lapse of forty-three years. He is also careful to say that the source of his information at Madrid in 1564 was Charles de Tisnacq. We know, too, how rigorous Clusius was in ascertaining facts in his own speciality, botany: he would never depend upon the description of a plant unless he had examined it with his own eyes. On all these grounds the testimony of Clusius is entitled to the greatest respect. Certainly Thuanus thought so, for in the subsequent editions of his *Historia* he altered his account of Vesalius so that it ran thus: "The renowned Vesalius *being tired of Spain and*

having obtained provision from Philip set out along with Jacopo Malatesta . . . for Cyprus, whence he journeyed to Jerusalem in order to discharge a vow he had made during a very serious illness at Philip's court."³⁵

Pantaleon's short sketch is the first published biography which we have of Vesalius. It appeared in his *Prosopographiæ*, printed in 1565. The author lays stress on the great pains which he took to ensure accuracy in the work, and as his principal authority upon Vesalius he names Conrad Gesner, who was certainly likely to be well informed. The *Prosopographiæ* is a very large book, but it apparently enjoyed a large circulation. This biography must thus have been widely read, since it was not hidden away in the privacy of personal correspondence. Had it been to any extent at variance with the facts it would have evoked contradiction from those who were conversant with them.

Andrew Dudith,³⁶ too, was a man whose evidence cannot lightly be set aside. Born in Buda in 1533, he had a most romantic career. He travelled widely in the pursuit of knowledge, and found a friend and patron in Cardinal Pole, whom he accompanied into England in 1554, and whose biographer he became. Later on he was made Bishop of Tina, and was chosen by the Austrian clergy to represent them at the Council of Trent. His marriage some time after led to his excommunication. He then joined the Protestants but soon drifted into Socinianism, and finally became an agnostic. In spite of his religious vagaries he appears to have been generally esteemed. He retained the confidence of the Emperor Maximilian II. and his successor Rudolph, to both of whom he acted as Privy Councillor, and by whom he was frequently employed on most important missions. In character amiable, sober, and charitable, he was a most painstaking searcher after truth. His letters and his published works proclaim his extensive knowledge and his freedom from prejudice of every kind. We may be sure that what he says regarding Vesalius was the outcome of careful investigation, and his testimony as to the reality of the pilgrimage is all the more valuable coming from a man who had ceased to believe in the value of that devotion. Moreover, the statement is made in reply to a friend who had referred to what Paré wrote about the anatomist in his book *De la Génération*.

The character of Thuanus is so well known that it need only be pointed out that his whole life appears to have been spent with the single aim of ascertaining the truth about the matters

which were to be incorporated in the *History* he had determined to write.

Of Miraeus, Castellano, Adam, and Sweertius, it is not necessary to say more than that they were not strictly contemporaries and that their works are mainly compilations.

Some subsidiary points may now be dealt with.

Solenander says that Vesalius parted from his wife in anger. Sweertius more than sixty years afterwards amplifies this by making her quarrelsome temper one of the reasons of the journey to the Holy Land. Kingsley is the only subsequent writer who is disposed to believe this. He reasons thus: "(Vesalius) was probably somewhat of a heretic at heart, probably somewhat of a pagan, while his lady . . . was probably a strict Catholic . . .; and freethinking in the husband, crossed by superstition in the wife, may have caused in them that wretched *vie à part*, that want of any true communion of soul, too common to this day in Catholic countries."³⁷ This, however, is mere gratuitous assumption. The religious views of Vesalius will be considered later; here it is enough to say that apart from Solenander there is no contemporary evidence as to the character of his wife. We do know, however, that whatever her temper may have been, she experienced no difficulty in finding another partner. Henri van der Meeren, her second husband, was a man of some position, the son of Walter, Seigneur of Saventhem.³⁸

It will be seen that the opinion that Vesalius was tired of his life at Court finds considerable support among our authorities. There is little reason to doubt this. Twelve years' wandering over Europe in the train of that unconventional monarch Charles V. was scarcely a suitable preparation for the rigid formality of the Spanish Court. Fortunate as he was in retaining the high regard of Philip, his independent character must have been mortified at what he could only consider as his servile position. Besides, he had amassed considerable wealth and could easily afford to retire from his post without any anxiety for the future. After his death it was estimated³⁹ that he had left 30,000 livres in ready money and that his estate would bring an annual revenue of 5000 livres.

There can be little doubt also that Vesalius looked forward in a vague way to the employment of his leisure in the teaching of anatomy, which he had so abruptly given up twenty-one years previously. The language of his letter (27th December 1561) to Fallopius certainly suggests this. He begins by expressing

his gratitude for the copy of the *Anatomical Observations*, and tells how having kissed the volume and having laid aside every other occupation, he had given himself up wholly to an eager and joyous perusal. He ends by confessing that the book had not only refreshed his cherished recollections of that most delightful time when he himself taught in Italy, but had also prompted pleasant dreams for the future. "Although now I have never a chance of dissecting, and can scarcely obtain possession of a skull, nevertheless I still retain the hope that opportunity may yet be afforded me of perusing that book of truth, man's body."⁴⁰

This letter affords convincing proof that he had never lost his keen interest in scientific pursuits, though so long debarred the practical means of gratifying his desires. We can well believe, therefore, that he hoped upon his journey to the East to make some interesting observations upon plants and drugs—a subject which attracted him greatly—and also to put some of his theories to the test.

But whatever influence may have been exerted by these circumstances—the nagging wife, the weariness of the Court, the desire to teach, etc.—no one of them, nor all of them put together, could have led to so arduous and so hazardous an undertaking as a journey to the Holy Land. A merchant engaged in the Levant trade, a young idle adventurer whose blood boiled with the *Wanderlust*, might indeed have made this expedition as his business or caprice directed. But with a man of the age and in the position of Vesalius it was otherwise.

THE REAL REASON—A PILGRIMAGE.

All our authorities agree that Vesalius went to Jerusalem. At that time this had practically only one meaning, viz. a pilgrimage—that is, a journey undertaken in fulfilment of a vow or from some other religious motive. Almost all our authors explicitly state such a reason in his case. It might well seem, then, that the matter is settled. For the sake of completeness, however, it is right to say a few words as to the religion of Vesalius. There can be no doubt on this point. Solenander indeed says he had no religion, but Solenander stands alone, and all the evidence is against him. Wherever the anatomist mentions the Catholic Church in his writings he does so in terms of the highest respect and as a loyal son might be expected to speak. For twenty years he had been in the service of the most orthodox Sovereigns. For five years he had lived under the

supervision of a tribunal which had no respect for persons and the sleepless suspicions of which a breath would disturb. The conclusion of Wauters is therefore abundantly justified: "De quelque manière que l'on étudie Vésale, on ne trouve rien qu'autorise à le classer parmi les esprits dont l'orthodoxie aurait été suspectée."⁴¹

To assume that Vesalius deluded Philip by alleging a pilgrimage while his real purpose was merely to escape from Spain, is to misread the facts. If some such excuse as this was absolutely necessary it is impossible to understand why he should have kept up the deceit even after he had reached the free soil of Venice. The difficulty and danger attending such a pilgrimage at that time can scarcely be conceived at the present day. If he was knave enough to practise the original deception in Spain we can hardly imagine him foolish enough to continue the deception after it had achieved his purpose and when its continuance only exposed him to most serious consequences.

But as we have shown above, there is no reason to suppose that he was anything else than what he appeared to be—that is, that he was a convinced believer. Such being the case, there was nothing wonderful in his making a pilgrimage. This was a very usual expression of the piety of the age, and both Charles and Philip had on many occasions shown their devotion in this fashion. On all these accounts, therefore, the inevitable conclusion follows that the real reason why Vesalius left Spain was that in consequence of a vow he was anxious to obtain the merit of making a pilgrimage to the places which had been hallowed by the living presence of our Saviour.

(To be continued.)

RECENT ADVANCES IN MEDICAL SCIENCE

MEDICINE.

UNDER THE CHARGE OF

W. T. RITCHIE, M.D., EDWIN MATTHEW, M.D., AND
J. D. COMRIE, M.D.

CYTOLOGY OF GASTRIC FLUIDS.

IN a thoughtful and well-illustrated paper by Caussade of Nancy (*Rev. de méd.*, 1914, xxxiv. 428) attention is directed to the clinical importance of the cytology of gastric fluids. According to the author, the examination should be made while the patient is fasting. Any residue

of food within the stomach should first be extracted, and 250 c.c. of normal saline solution should then be introduced by means of the stomach tube. If there be any clinical evidence of gastric dilation it is advisable to practise epigastric succussion, or to ask the patient to lie down and sit up several times in succession, in order to bring the saline solution into contact with every part of the gastric mucous membrane. Thereafter, the fluid is withdrawn: a portion is centrifuged for ten minutes; a little of the deposit is transferred to a slide; hæmatoxylin, eosin and glycerin are added successively, and the stained preparation is examined under the microscope. The following cytological appearances are described:—

1. *Normal Stomach*.—The film presents (*a*) squamous epithelium derived from the mouth, the pharynx, and the œsophagus; (*b*) debris of epithelial cells; (*c*) broken-down leucocytes; and (*d*) epithelial cells of various kinds derived from the respiratory tract, *e.g.*, ciliated epithelium from the bronchi, and alveolar epithelium containing carbon particles. The total number of cells is scanty.

2. *Pathological conditions* may be revealed by the presence of leucocytes (usually polymorphonuclears), erythrocytes, squamous epithelium from the mouth, pharynx or œsophagus, and lastly columnar epithelium from the gastric mucosa. In non-malignant affections of the œsophagus an abundance of squamous epithelium is observed, and polymorphonuclear leucocytes are also detected if the affection is an inflammatory one. In gastritis, polymorphonuclear leucocytes are likewise present—whereas a lymphocytosis is uncommon—together with columnar epithelial cells in all stages of degeneration and disintegration. Red blood corpuscles may also be detected. In cases of gastric hæmorrhage or ulceration the cytological picture varies according to the causal condition, the gravity of the hæmorrhage, and the interval elapsing between the bleeding and the examination. In cases of carcinoma of the stomach, one may detect fragments of tumour, clusters of cancer cells, or single atypical cells. These cells are often large, irregular, and sharply defined. Their cytoplasm is usually deeply stained, and the nucleus, which is of varying form and often presents many nucleoli, is often so large as to fill a considerable portion of the cell. Sometimes the nucleus is seen to be dividing. Multiplicity of nuclei is of the utmost value in the recognition of cancer cells. The cytoplasm of cancer cells does not present any granules or vacuoles, but it may contain droplets which yield a glycogen reaction.

The recognition of cancer cells in gastric fluids is by no means easy, and the difficulty may be so great as to discourage the observer. Lymphocytes, polymorphs, micro-organisms, yeasts, and in some instances red blood corpuscles will also be found. In 39 cases of carcinoma of the stomach the cytological examination afforded negative results in 21; but in 18 cases cancer cells were detected. On the other

hand, when we can demonstrate that there is no gastric residue undergoing fermentation, that there are few cells, no atypical cells and few polymorphs or none at all, the cytological examination may then be of the utmost value in excluding malignant disease of the stomach. The author does not record the case histories nor the cytological findings in individual cases, nevertheless his paper is a practical contribution to a method of diagnosis which has hitherto received scant attention.

THE ETIOLOGY AND TREATMENT OF ACUTE RHEUMATISM.

To the physician the etiology of acute rheumatism is not merely of academic import. The problem appeals to him in many aspects, and not least in those concerning the specificity of the diplococcus rheumaticus and the efficacy of the anti-rheumatic sera. The pioneer work of Paine, Poynton, and other British investigators on the bacteriology of acute rheumatism has been recently amplified by Herry of Liège (*Bull. de l'acad. roy. de Belgique*, 1914, xxviii. 76). In 49 out of 60 cases the specific diplococcus was isolated. The organism was found both at the start of the illness and after the febrile period had ended, and cultures were obtained from the blood as well as from the synovial, pleural, and other serous fluids. After describing the morphological and cultural characters of the organism, the author points out that although intravenous or subcutaneous injections are feebly pathogenic, the endotoxin of the organism is much more potent. The experimental lesions in the rabbit's heart were of the same nature as those in the human heart. Arthritis was invariably induced in rabbits which had received two injections (one intravenous, the other intra-articular) at intervals of eight to fifteen days. The conclusion is drawn that the characteristic features of acute rheumatism are due to the concomitant action of the micro-organism and its toxin, and that the arthritis, endocarditis, pericarditis and pleurisy which may develop during the course of the disease are manifestations of local anaphylaxis. Rheumatic endocarditis and arteritis are due to the action of an endotoxin.

The most striking section of Herry's paper is that dealing with the serotherapy of rheumatism. He finds that the ordinary anti-rheumatic sera obtainable on the market are of little benefit. Very different, however, were the results obtained in 32 cases of acute, subacute, or chronic rheumatism by the use of an antitoxic serum prepared by the author. In many of his cases the disease was of a severe form and other methods of treatment had been tried in vain. When the serum treatment was instituted, the administration of all drugs was discontinued, except that in some instances calcium chloride was given to obviate any accidental ill-effects of the serum. Serum therapy was found to curtail the length of the illness, to lessen the risk of grave complications, and to promote recovery therefrom. Acute rheumatism

is a disease bearing endless and grave after-effects in its train. The brilliant sero-therapeutic results obtained in Liège awaken the hope that after the barbarian hordes have been driven from his country Herry may carry on still further investigations so full of promise.

ANAPHYLACTIC PHENOMENA IN ASTHMA.

In view of the analogy between the manifestations of asthma and those of anaphylaxis, it has been thought that an asthmatic seizure might be of anaphylactic origin. Following up their interesting work upon the anaphylactic nature of paroxysmal hæmoglobinuria, Widal and his collaborators (*Presse Méd.*, 1914, 525) have recorded some most interesting and instructive observations upon a patient in whom severe attacks of asthma were provoked by the odour emanating from sheep. It was shown that prior to the onset of dyspnoea the patient presented a series of phenomena constituting a "hæmoclastic crisis," similar to those observed in cases of paroxysmal hæmoglobinuria and of alimentary urticaria. The crisis was characterised by leucopenia, fall of arterial pressure, hypercoagulability of the blood and lowering of the refractometric index of the blood serum. The crisis began speedily, developed silently, was not attended by any symptoms, and lasted for about two hours. As the crisis gradually passed off the paroxysm of dyspnoea began, and the former had terminated by the time the latter was fully developed. There were consequently two successive phases, the first being wholly humeral and indicating that the causal factor had led to a sudden disturbance of equilibrium on the part of the constituents of the plasma, and a second phase indicating a local action upon the tissues of the body.

The success which Widal had attained in the treatment of paroxysmal hæmoglobinuria by means of intravenous auto-serotherapy led him to try the same therapeutic measure in asthma. The patient was given sixteen intravenous injections of his own serum, the amount administered at each injection varying from 25 to 60 c.c. Although the patient was subsequently exposed to the toxic emanations for six hours he did not develop an attack of asthma. But the immunity thus acquired did not last for more than twelve days. Do other cases of asthma present similar hæmoclastic crises, and what benefit do they obtain from auto-serotherapy? In one patient affected with paroxysmal hæmoglobinuria who was under the reviewer's care auto-serotherapy was of no avail, but the serum was not given in such massive doses as Widal recommends.

CEREBRO-SPINAL PRESSURE.

Claude, Porak and Rouillard (*Rev. de méd.*, 1914, xxxiv. 393) have made a careful study of the intra-spinal pressure as estimated by means of a special manometer, which is attached to the lumbar puncture needle.

Incidentally they point out how important it is to note the initial pressure before the fluid is running freely. As Quincke and other German workers had failed to record the initial pressure and had been using faulty technique, their observations are wholly worthless. Healthy persons in the recumbent posture usually have an intra-spinal pressure of from 12 to 15 cm. of water, but when in the sitting posture, of from 25 to 30 cm. In hydrocephalus, serous meningitis, and all forms of infective meningitis, the intra-spinal pressure is raised. Thus in one case the pressures recorded on successive days were 38, 44, 47, 52, 58 cm. of water. In cases of cerebral tumour, hypertension is constant and early. Consequently the estimation of the cerebro-spinal pressure may enable a diagnosis of cerebral tumour to be established even before there are any signs of optic neuritis. Low readings were obtained in cases of dementia præcox, neurasthenia, and melancholia: in epileptics the figures were normal. The intravenous pressure at the bend of the elbow is normally about 17 cm. of water, while in cases of pleurisy the intra-pleural pressure was found to vary from 5 to 10 cm. of water.

W. T. R.

SURGERY.

UNDER THE CHARGE OF

J. W. STRUTHERS, F.R.C.S., AND D. P. D. WILKIE, F.R.C.S.

THE SURGICAL TREATMENT OF BRONCHIECTASIS.

At the meeting of the American Surgical Congress of this year, Meyer, and Mumford and Robinson read papers dealing specially with the relative merits of the various surgical methods of treating bronchiectasis (*Ann. of Surg.*, July 1914). In both papers the difficulty of making an accurate diagnosis at an early stage of the disease is pointed out, and it is interesting to note that the authors are emphatic in stating that radiography is of very little value in making a diagnosis. Meyer states that it is not safe to place much faith in the shadows shown on the plate in this disease, while Mumford and Robinson say that when the physical signs are doubtful the X-ray cannot differentiate between bronchiectasis and other lung conditions. These statements are of importance, because in some quarters much stress is laid on the supposed value of radiography in obscure cases. Meyer takes up the different methods of treatment systematically and first discusses incision of the lung, pneumotomy, which he regards as indicated in sharply circumscribed disease only. A wide resection of ribs and intercostal tissues is essential in the first place. Following this the presence or absence of adhesions between the layers of the pleura must be definitely ascertained and in their absence the two layers must be carefully stitched together.

Meyer has found adhesions absent in cases of old-standing disease. The lung is explored with a needle, and when pus is struck an incision is made alongside the needle, preferably with the cautery. In cases where the cavity is deep, blunt-pointed forceps should be used instead of a needle. Drainage by tube is then established. In strictly localised disease pneumotomy may be curative, but in diffuse disease it fails, and the next measure to be considered is the use of one or other method of inducing collapse of the lung. The production of artificial pneumothorax has, according to Meyer, failed to cure in bronchiectasis, and he accordingly recommends other plans, such as Tuffier's, which consists in separating the costal pleura from the ribs over a wide area and filling the cavity with fat or other material which compresses the lung. Extensive resections of ribs to allow the chest wall to fall in, may be tried, and this may be preceded or followed by ligation of the branches of the pulmonary artery to the portion of lung affected. This ligation has been done ten times, and all the patients recovered from it. It is followed by consolidation or "carnification" of the lung tissue, and in combination with plastic operations has given good, though not curative, results. In addition, division of the phrenic nerve on the affected side may be carried out to help in immobilising the lung. All these measures fail in advanced cases, because the cavities are thick-walled and rigid and will not collapse. Under these circumstances the only measure left is the removal of the affected portion of lung. Sixteen cases of pneumotomy have been reported, with 8 cases of cure or improvement and 8 deaths. The operation is a serious one, and should be considered as a last resort after other treatment has effected partial improvement.

Mumford and Robinson are of opinion that artificial pneumothorax should be tried. Improvement may follow its use, and it is relatively safe. When it fails to achieve its object they believe that attempts to induce collapse by rib resection are inadvisable, for the results are bad. The operation so interferes with coughing and expectoration that the patient cannot get rid of the foul contents of his cavities and will probably succumb. They look to resection as offering the greatest promise of cure, and they lay great stress on the fact that successful excisions have usually been carried out in cases in which other means had already brought about improvement but not cure. Primary excision, on the other hand, throws too severe a strain on the circulatory and respiratory apparatus, and should not be attempted. Their position may be summarised as follows. In the early stages of bronchiectasis try artificial pneumothorax. In late cases excision is the only hope of cure, available only when the disease is limited to one lobe, and only to be carried out after compression by pneumothorax or pulmonary arterial ligation has prepared the way.

RESULTS OF CONSERVATIVE TREATMENT OF CYSTIC DISEASE
OF THE BREAST.

Useful information is given in a report by Greenough and Simmons (*Ann. of Surg.*, July 1914) on the results of the conservative treatment of cystic disease of the breast or chronic cystic mastitis. Various observers have stated that carcinoma is specially prone to develop in the course of this disease, and the percentage of cancer cases is variously stated as from 10 to 25 per cent. Greenough and Simmons have observed 83 cases in which cystic disease was demonstrated by examination of portions removed, and in which treatment consisted in the removal of the diseased area without complete amputation of the breast. While they have been able to follow these cases for periods varying from 1 to 17 years, with an average of 7 years for each case, they emphasise the fact that they present the results as affording some reliable evidence of the natural history of the disease and not as end results.

Four of the patients developed carcinoma in the affected breast from one to eight years after the operation for cystic disease. Thirteen patients were found to be suffering from recurrence of the disease: in the breast first affected in 8 cases, in the other breast in 5 cases. Sixty-six patients appeared to have been cured. The percentage of malignant cases was thus lower than that recorded by others. The percentage of unsatisfactory results of any kind was 20, and in view of this, the authors maintain that in all but the very mildest cases the gland tissue of the affected breast should be completely removed. This may best be done by "subcutaneous amputation," *i.e.* turning up the breast from an incision placed below it and leaving the skin over it intact, with the nipple and areola.

HÆMORRHAGIC OSTEOMYELITIS.

In an attempt to explain the origin of the conditions known as medullary giant-celled sarcoma, myeloma, benign bone cyst, osteitis fibrosa, traumatic solitary bone cyst, and some other allied conditions, Barrie (*Surg. Gyn. and Obstet.*, July 1914) suggests that they might all be grouped under the title "hæmorrhagic osteomyelitis." He believes that they all have a common origin and are the result of a non-infective, low grade inflammatory lesion following trauma. The trauma is followed by hæmorrhage and the development of a very vascular granulation tissue. The occurrence of giant cells in this tissue is, according to Barrie, merely evidence of the chronic inflammatory nature of the lesion, for, as he points out, they are found in other chronic inflammatory conditions, round foreign bodies, in tuberculosis and in syphilis, etc.

He quotes Bloodgood as saying that if we leave out the giant cell

we have a tissue resembling vascular granulation tissue, and maintains that the presence of this granulation tissue is the best evidence one can have of inflammation. In cases where the tissue goes on to fibrous tissue formation the various types of fibrocystic disease in bone result, and Barrie states that the nearer the lesion is to the end of a long bone, the greater is the probability of its retaining the hæmorrhagic granulation tissue type, while lesions away from the ends of bones tend to become more fibrous.

Illustrative cases are described, and a discussion of the histological evidence in favour of Barrie's view is appended by Hillman.

A DISCUSSION ON POTT'S FRACTURE WITH COMPLICATIONS.

Speed (*Surg. Gyn. and Obstet.*, July 1914) has made a study of 208 cases of Pott's fracture, the value of which lies in the demonstration of the great variety of lesions which are apt to be classed as Pott's fracture and submitted to routine treatment. His conclusions are as follows. Pott's fracture as classically understood is very rare. Each ankle fracture should be treated in accordance with the most searching diagnosis, aided, if possible, by skiagrams and not by routine method. Too much faith should not be given to antero-posterior skiagrams through the ankle. Lateral views should be made to show the correct position of the astragalus in the antero-posterior axis and to reveal lipping fractures of the tibia, etc. More emphasis should be laid on the treatment of fracture of the external malleolus, with or without ligamentous damage on the inner side, by over-correction in extreme inversion. Special attention should be paid to cases with antero-posterior displacement of the foot, as these indicate lipping fractures of the tibia or complete separation of the external malleolus. Operation should be considered in these cases. Operative measures, of simple replacement, nailing, or other procedures, give perfect anatomical results in selected cases. Use of the foot should not be permitted until pain is not caused.

J. W. S.

OBSTETRICS AND GYNECOLOGY.

UNDER THE CHARGE OF

A. H. F. BARBOUR, M.D., AND J. W. BALLANTYNE, M.D.

THROMBOSES IN PREGNANT WOMEN.

CESARE DECIO (*Ann. di Ostet. e. Ginec.*, ann. xxxvi. vol. i. pp. 338-359, 1914) draws attention to the fact that whilst sufficient observations have been made upon the subject of puerperal thromboses to establish their symptomatology and prognosis on certain foundations, there is a remarkable paucity of records of thrombotic states in pregnancy and an absence of sure knowledge of their clinical significance and results. The literature on the subject of pregnancy-thrombosis is

scanty; but Esser in a study of 35 cases of puerperal thrombosis is able to state that 5 of them were preceded by thrombosis in pregnancy and that there was 1 case in which thrombosis occurred in gestation, was cured then, and did not return in the puerperium; Goldsborough has reported a fatal case at full term and Bar one at the fifth month; and in the former the morbid process affected the iliac, in the latter the mesenteric veins. Decio has collected together eight cases in the obstetrico-gynecological clinic at Parma which he regarded as instances of thrombosis of the veins, superficial or deep, of the lower limbs in pregnancy, and from their careful study he comes to some conclusions which are of practical importance. Seven of the patients were near the close of pregnancy when the symptoms of thrombosis began: one only was at the sixth month, and in her case there was hydramnios which gave to the uterus a size corresponding to the full term. In three of the patients both legs were affected, in one the right alone suffered, and in four it was the left: consequently there was a decided preference for the left side, although, of course, the number of cases is too small to draw definite conclusions from. The symptomatology was clearly marked. There was pain, usually coming on suddenly and with no precedent bad health, in the lower limb, usually to the inner side of the thigh, in the calf, or in the popliteal space: sometimes the pain coincided in position with a hard, cord-like structure (*e.g.* the thrombosed saphena vein), but when a deep vessel was affected no cord was to be felt: then followed a marked and widespread oedema affecting the whole leg and in a few instances the lower part of the abdomen also, on the same side; pressure generally caused an exaggeration of the pain: and, as a rule, there were no signs of systemic disturbance (quickened pulse or raised temperature). From the absence of feverish phenomena Decio is inclined to regard these thrombotic states as aseptic in nature: but he points out that if labour supervene whilst they are still present the clot may become secondarily infected and a true phlegmasia alba dolens occur in the puerperium, as indeed happened in two of his patients, proving fatal in one of them. It is this possibility which gives to these pregnancy-thromboses their real gravity, although one must not forget the other risk, that of separation of clot and pulmonary embolism. Decio thinks he is warranted in terming them pregnancy-thromboses, because there is evidence that the mechanical and biological conditions of the circulation and of the blood in gestation are more important etiological factors than are slowing of the blood current, infection, and the like. It is somewhat curious, too, that in only half the cases did the thrombosis occur in a varicose vein, and in only one of the remaining four cases were the varicosities serious. There is not yet a consensus of opinion as to the exact nature of the blood changes in pregnancy, nor of the relations which they bear to the internal secretions of the genital organs: but Decio is persuaded that

sufficient is known to give them a foremost place in the etiology of thrombosis at this time in a woman's life. So long as the clot does not become infected after confinement, the pregnancy and lying-in would seem to run their course undisturbed; such, at least, is the opinion of the author, but the writer of this abstract has had a fatal case in which the clot became infected very early in, if not before, the commencement of labour. At any rate there can be no doubt that it would be well for obstetricians to try to prevent the occurrence of gestation-thromboses. Decio laments that one so seldom has an opportunity of introducing prophylaxis, for the evident reason that such patients usually come under notice with the thrombosis already developed; but this simply means that medical men must straightway establish a more intimate and continued interest in and supervision over the affairs of pregnancy. For instance, the constriction of the body and limbs by corsets and garters, etc., must be avoided in gestation, whilst the taking of regular muscular exercise is to be insisted upon. Unfortunately it is often difficult, on account of the existence of varicose veins, to get the last-named precaution carried out. When the thrombosis has appeared the treatment must consist in putting the limb at complete rest in a slightly elevated position, in applying hot fomentations, and in taking the most minute and thorough aseptic precautions in the ensuing labour and puerperium so as to avoid infection of the thrombi. This malady of gestation is not necessarily followed by "white leg" either in the pregnancy or in the lying-in period, but it does undoubtedly make the supervention of that serious complication more likely; consequently it ought never to be regarded lightly. In many cases it can be cured in the pregnancy by rest and careful management.

EXTRACTION OF THE SEPARATED FETAL HEAD.

Drs. Potocki and Sauvage (*Ann. de Gynéc. et d'Obstét.*, ii. S. vol. xi. pp. 257-269, 1914) record a very difficult case of retention of the separated fetal head after decapitation and discuss the ways in which this obstetrical emergency may be dealt with. The patient was a primigravida and had reached seven and a half months; she was 17 years of age, and was admitted to the Maternité de la Pitié in Paris after having been twenty hours in labour. The presentation was diagnosed as the breech: the child was alive; the os was dilated to the size of a five-franc piece; and the membranes were intact. Two days later Dr. Potocki found to his surprise that the woman was not delivered, and on making an examination he discovered that the diagnosis which had been accepted by the hospital staff was wrong and that the shoulder was at the brim and the right hand in the vagina. He then put the woman under chloroform and attempted to do internal version, but on account of the uterine retraction he was unsuccessful; an unstretchable ring surrounded the shoulder and prevented the hand passing in and

reaching the feet. The fetal heart was heard at the rate of 160 to 180. With Tarnier's embryotome decapitation was performed, and the trunk of the child was extracted with difficulty; but the head could not be removed by the hand, so tightly was it held by the retracted uterus. Basiotripsy was then carried out, although with considerable difficulty and not completely. Next a Champetier bag was introduced to open up the parts, but some hours later it was found impossible, after several attempts, to apply a cranioclast; another wait took place in the hope of spontaneous expulsion following, but this hope also was disappointed, and finally Dr. Potocki was compelled to do a sub-total hysterectomy, taking away the uterus with the head still inside it. Although the patient had been very seriously ill she recovered, her convalescence, however, being interrupted by double parotitis. The uterus removed by hysterectomy contained the placenta, some of the membranes, and the head and neck of the fetus; the bones of the head showed a degree of ossification much more advanced than is usually met with after only seven and a half months of intra-uterine life. The uterus in section exhibited clearly the retraction ring, above which lay the chin and occiput of the infant; thus the incarceration of the head was easily accounted for.

An emergency of the kind reported by Drs. Potocki and Sauvage cannot be a common experience; but it raises the question of the best methods of dealing with a retained and separated fetal head and of the best order in which to apply these methods. The great cause of difficulty either in the performance of the decapitation or in the extraction of the child is the presence of uterine retraction, for such a state prevents the access of the operator's hand to the neck and hinders the downward passage of the head. So far as decapitation is concerned uterine retraction leads to cramping of the hand which the obstetrician is employing to guide his instruments and greatly reduces the space in which he is able to work. After the head has been actually separated from the trunk and the latter expelled, it is generally possible to extract the former by putting two fingers in the mouth and pulling upon the lower jaw. This manoeuvre is greatly aided by general anesthesia and supra-pubic pressure. If this fails, then the stump of the neck should be seized with a strong pair of catch-forceps and traction made upon it whilst the fingers still pull upon the jaw. If failure to extract has again to be recorded, one must replace manual by instrumental means. Forceps, according to Dr. Potocki, is not to be thought of on account of the risk of uterine rupture: at any rate craniotomy and cranioclast usually serve very well. There may, however, be no need for instrumental interference, for nature may, at the eleventh hour, so to say, come to the aid of the patient: the spasmodic retraction of the uterus may pass off, alternate contractions and relaxations may begin again, and the head be expelled spontaneously. If nature does not simplify

matters, then craniotomy, in the form of basiotripsy, must, as has been stated, be carried out : and this must be followed by the further comminution of the head with the cranioclast and by its extraction with the same instrument. But if these means fail, as they did in Dr. Potocki's case, what then? Notwithstanding the case reported by Loisel in 1892 in which the separated head was retained for 112 days in the uterus without the production of septicæmia, and the other case recorded by Funck-Brentano in 1913 (*Semaine gynéc.*, vol. xviii. p. 181, 1913) in which for three months it lay in the uterus without causing more than some blood losses, there can be no doubt that "doing nothing" is not a safe procedure to be followed for long. There are the risks of uterine rupture and of infection to be feared, and waiting can only be tolerated in their absence : in their presence immediate hysterectomy is indicated. Under other circumstances it is permissible, in Dr. Potocki's opinion, to wait, keeping the patient under rigid supervision and using strict asepsis : then if the retraction of the uterus does not pass off, notwithstanding the use of morphine and chloral, and if signs of infection appear, the proper plan to pursue is to open the abdomen and remove the uterus with the contained head and very carefully to restore the peritoneal floor of the pelvis. The line of amputation is best made through the lower uterine segment rather than through the upper part of the dilated cervix, which is too lax to give a proper hold for sutures. This was what Potocki did with such success, and he refers to a similar case treated in the same way by Fochier and reported by Planchu in 1913 (*Lyon méd.*, No. 39 for 1913, p. 497). The grand conclusion of the whole matter, however, must be that shoulder cases should be turned early and not allowed to become impacted.

J. W. B.

PATHOLOGY.

UNDER THE CHARGE OF

THEODORE SHENNAN, M.D., AND JAMES MILLER, M.D.

THE ETIOLOGY AND TREATMENT OF CANCER.

PROFESSOR G. FICHERA discusses (*Tumori*, July-August, 1913, p. 124) the evolution of his theory of oncogenic disequilibrium as explaining the origin of malignant tumours, and the application of histogenic chemotherapy in treatment of these new growths.* Many of the

* "Oncogenic" = "producing tumours." "Oncolytic" = "capable of dissolving or destroying tumours." "Autolysis" in the present connection means the self-destruction or breaking down of tissues or of portions of organs by the action of ferments most usually belonging to the protease group, which are present in all cells of the body, when these tissues or organs are kept at a uniform temperature, ordinarily 35 to 37 Centigrade, in an aseptic condition, or with the addition of antiseptics which restrain the development of bacteria but do not interfere with the action of these ferments. "Autolysates" are the substances resulting from "autolysis."

investigations referred to have been carried on under Fichera's supervision in Rome, but the work conducted in countries other than Italy is fully acknowledged.

In this paper he traces the advance in our knowledge of the conditions of implantation, development, and involution of tissues, whether of foetal origin, or derived from cancer in man, when inoculated into rats. He recognises the importance of the reaction of the tissues of the host to homologous or to heterologous inocula; the importance of the site of implantation; the varying fate of the implanted tissue, depending on its new environment; the modification of the resistance offered by the host as a result of preventive inoculation; and the effects of autolysates of foetal or of neoplastic tissues upon inoculated rats, and upon cancer in man.

These and many other researches along other lines led Fichera to the belief that many phenomena are common to the biology of embryonic or foetal tissue, and to that of cancerous tissue; that many general and local reactions of the host are common to both, and that inoculation of both kinds of tissue give comparable results, involving the liberation of oncolytic substances which stimulate the organs to antitlastic activity.

Carrying these researches further, Fichera and his co-workers investigated the microscopic changes in the viscera of inoculated animals, whether stimulated or immune, and of human beings suffering from malignant growths; the results of inoculation of suspensions or of extracts of different organs, and the condition of the blood-serum in normal and in inoculated rats; and worked out the details governing the therapeutic employment of tissue extracts. They also investigated the behaviour of inoculated tissue when implanted in different organs—spleen, liver, kidney, suprarenal, pancreas, testicle, and brain. They found that a scale of resistance could be drawn up, showing the spleen at the top and the testicle at the foot of the scale—that is to say, the degree of resistance depends upon the amount of oncolytic substances present in any given organ.

The bone-marrow and the liver of rats under all conditions of implantation tend to regain the functional structure of early life. Researches upon the evolution and involution of the thymus at different ages, and upon the alterations occurring in the spleen in individuals suffering from cancer, are also brought into line.

Fichera concludes that these researches, taken along with the knowledge attained of the changes in the bone-marrow occurring at the menopause, have shown that one of the "anatomo-functional" characteristics of the period of predisposition to spontaneous new growth in man is the rendering inactive, through involution or atrophy, of the organs constituting the hæmopoietic system.

It has been found that rats display a diminution of resistance

after splenectomy, and that resistance is increased by inoculation of suspensions of spleen or of thymus. Blastomata have been noticed to disappear in rats to which extracts of thyroid or of thymus have been given. Inoculation of extracts of normal or of hyperplastic spleen has brought about the disappearance of epitheliomata and of sarcomata in rats and mice. In the case of cancer in man, healing or amelioration has been reported to result from inoculation of extracts of mammary gland, thyroid, or thymus.

In dealing with the action upon new growths of extracts of autolysed organs, Fichera maintains that this procedure belongs to the field of isotherapy, rather than to that of vaccination. He discusses principles, and not practical details, of preparation and administration.

According to Fichera, therefore, cancerous new growth is due to a disharmonic state, to a disturbance of the chemical and morphological correlation of the tissues and organs; and the rational treatment of cancer should consist in an endeavour to revive the activities of organs, such as the thyroid, thymus, spleen, and bone-marrow, which supply "oncolytic" substances.

It is not easy to gather if Fichera regards all varieties of tumour growth as essentially possessing some element of malignancy, or if he is concerned only with tumours ordinarily looked upon as malignant. It is reasonable that one should require of any theory put forward to explain the genesis of new growths, that it should account for the origin both of benign and of malignant tumours.

In a later number of the same periodical (*Tumori*, November-December 1913, p. 364) there is a paper giving the results of the clinical application of the experimental work which has just been referred to.

In this number Dr. A. Bazzocchi reports the case of a man suffering from gastric carcinoma, and the results of treatment by means of autolysates of foetal tissues.

The patient, a man 48 years of age, came under observation in August 1912, suffering from digestive troubles, progressive loss of weight and muscular power: temperature raised towards evening; feeling of weight at the stomach after eating, which became acute after dinner, so that he could not lie with comfort in bed or obtain quiet sleep. When first seen he was much emaciated: there was evident resistance in the region of the pylorus, and this was accompanied by a feeling of pain on deep palpation. The stomach was dilated; the tongue thickly furred: there were several enlarged infiltrated lymphatic glands in the supra-clavicular region. Malaria was excluded as a result of a blood examination. Ordinary remedies for dyspepsia yielding no benefit after a fortnight's trial, a test meal was administered. This showed that digestion of starch was active; hydrochloric acid was wanting, but lactic acid was present in abundance.

A diagnosis of gastric carcinoma with supra-clavicular metastasis was made. An autolysate of fetal organs (thyroid, thymus, spleen) prepared by Fichera was obtained and 5 ccm. were injected in the beginning of October. Injections of a similar quantity were repeated every four days, without the patient suffering any pain or other inconvenience. Following the first injection the temperature rose to 37.3° C. (99° F.), but, after the third one, even this slight rise disappeared. The general condition of the patient rapidly improved, his complexion lost its earthy tint, and he began to put on weight, gaining 6 kg. (circa 12 lb.) in three months: the feeling of weight at the stomach gradually passed off, and sleep became again tranquil. In December 1912 an examination of the blood showed a rise in the percentage of hæmoglobin from 45 to 65: the red blood corpuscles rose to 4,230,000 in place of the former 3,754,000 as in August, and white blood corpuscles became practically normal. Consequently the results were more favourable than had been anticipated. An infiltrated gland remained in the left supra-clavicular region, whence several had been removed in the end of November for the purpose of microscopical examination so as to afford an anatomical basis for the diagnosis.

The patient returned in October 1913 greatly improved in health. He felt well and vigorous: his weight had increased other 9.5 kg. He could eat a mixed diet without discomfort: slept well: walked long distances without undue fatigue, and his skin and mucous membranes had recovered their normal colour. Palpation of the abdomen, whether superficial or deep, caused no discomfort: the hæmoglobin percentage was 70: his red blood corpuscles were 4,989,700 per cmm. and his white corpuscles were normal.

T. S.

NEW BOOKS.

The Practice of Paediatrics. By CHARLES GILMORE KERLEY, Professor of Diseases of Children, New York Polyclinic Medical School. Pp. 878. Philadelphia and London: W. B. Saunders Co. 1914. Price 25s. net.

We think that Dr. Kerley has done well to amplify his previous work on the treatment of diseases of children by producing this more extensive treatise. It gives a good idea of the subject, and may be recommended as likely to prove useful to general practitioners on two grounds—firstly, that the more common diseases are very fully discussed, and secondly, that the sections on treatment are very complete and are written from the point of view of private practice. To the specialist the book is perhaps less interesting, because the rarer diseases of children are noticed rather scantily, or even omitted. Indeed it strikes the reader that while Dr. Kerley has obviously a very large experience

of common maladies, his experience of the less common ones is not correspondingly extensive. As instances of what we consider undue brevity we may refer to his compression of diseases of the liver and spleen into three pages, and lymphatism into less than a page. In the rather miscellaneous collection of unclassified diseases (ranging from rheumatism to dwarfing) there are a number of suggestive hints on the management of some of the symptom groups which are apparently more common in the wealthier than in the poorer section of the community, the class of case of which lithiasis, recurrent bronchitis, etc., are examples. Among doubtful statements is that on p. 486, that Mongolian idiocy is found only in the Caucasian race. As a matter of fact Mongols occur in negro races, and quite possibly in other stocks as well. To speak of "Progressive deafness due to neuritis acustica (Ménière's disease)" (p. 665) in hereditary syphilis is rather misleading. The deafness of late syphilis is as often sudden, complete, and permanent, as gradual and progressive. The most notable omission in the paragraphs on treatment is the absence of reference to X-rays in the management of ring-worm. Notwithstanding the small defects we have referred to, we are confident that in the main Dr. Kerley's book will be found a useful guide to practice.

Diseases of the Rectum and Anus. By P. LOCKHART-MUMMERY, F.R.C.S.(Eng.). Pp. viii. + 348, with 102 Illustrations. London: Baillière, Tindall & Cox. 1914. Price 7s. 6d. net.

THE aim of the author has been to provide a practical guide to the treatment of diseases of the rectum and anus. The book is of special value in that the author describes only those operations and methods of treatment which he has found from personal and extensive experience to be most serviceable. Great stress is laid on the importance of antiseptic technique, and the writer holds that it is perfectly possible to keep wounds about the rectum and anus aseptic for forty-eight hours or more after the initial cleansing. Open ether is advocated as the best anæsthetic for rectal cases, and it is stated that it is not only unnecessary but unwise to "push" the anæsthetic sufficiently to check the rectal reflex or cry. The operative and palliative measures in cases of cancer of the rectum are very fully dealt with. Total excision by the abdomino-perineal method is the author's operation of choice, though he does not adopt it as a routine.

This book, as a whole, is pleasantly written and easy to read, but there are a few obvious misprints which have escaped notice in the revision of the text. Most of the illustrations are, almost necessarily, semi-diagrammatic, but they serve their purpose well. We can thoroughly recommend this book to surgeons and general practitioners alike as a thoroughly practical and eminently useful volume.

Isolation Hospitals. By H. FRANKLIN PARSONS, M.D., D.P.H. Pp. ix. + 275. Cambridge : At the University Press. 1914. Price 12s. 6d. net.

THIS volume supplies a long-felt want, and accomplishes for the fever hospitals and sanatoriums what Dr. Mackintosh has done so well for the general hospitals. The lamented death of the author, as the proofs were going to press, necessitated the completion of the work being left in the able hands of Dr. Bruce Low. The book covers a large field. After an adequate historical sketch, all practical points connected with the utility, sites, design and construction of isolation hospitals is discussed in a most full and masterly manner. Special chapters are devoted to movable hospitals, smallpox hospitals, and port sanitary hospitals, and the details of fever hospital administration, and the measures for the prevention of cross infection and return cases are fully considered. Questions of cost are not omitted, and a useful addition to the volume is the chapter on sanatoria for tuberculosis. The value of the volume is much enhanced by its wealth of plans and illustrations of all types of hospital and sanatorium construction, and we regard it as an absolutely necessary addition to the library of all medical officers of health and superintendents of fever hospitals.

NEW EDITIONS.

Outlines of Zoology. By J. ARTHUR THOMSON, M.A., LL.D. Sixth Edition. Pp. xxii. + 855. London: Henry Frowde and Hodder & Stoughton. 1914. Price 12s. 6d. net.

It is hardly necessary to do more than mention the appearance of the sixth edition of this well-known text-book. It has for many years been recognised on all hands as the best small manual of biology in the English language from the pen of a highly gifted biologist and teacher. The student of to-day owes more than he knows to Professor Thomson for providing him with so admirable a text-book.

Defensive Ferments of the Animal Organism against Substances out of Harmony with the Body, the Blood-Plasma, and the Cells; their Demonstration, and their Diagnostic Significance for Testing the Functions of Different Organs. By EMIL AEDERHALDEN, Director of the Physiological Institute of the University of Halle a S. Third Edition. Illustrated. English Translation by J. O. GAVRONSKY, L.R.C.P., M.R.C.S., M.D., Halle a S., and W. F. LANCHESTER, M.A. London: John Bale, Sons & Danielsson, Ltd. 1914. Pp. xx. + 242. Price 7s. 6d. net.

DR. AEDERHALDEN'S work on the defensive ferments, culminating in the discovery of the biological test for pregnancy, has excited interest

all over the world, and in the pages of this *Journal* (vide No. for October 1913, p. 362; February 1914, p. 180; and May 1914, p. 440) the main features of this important advance in physiology and diagnosis have been indicated. For those who do not read German easily the English translation of the third edition of Abderhalden's work by Dr. Gavronsky and Mr. Lanhester will prove a boon: it sets forth a very technical and somewhat complicated subject clearly and in easily-understood terms. For readers who have followed Abderhalden's researches as they have appeared, the translation of "*fremd*" (foreign) and "*eigen*" (inherent or native) by the words "harmonious" and "disharmonious" is rather inconvenient: but it gives perhaps a more correct rendering of the thought underlying the phraseology, and is not therefore to be condemned. It must, however, be borne in mind in reading the book: for the terms "foreign" and "native" to the blood have come already into common use. It cannot yet be affirmed that Abderhalden's dialysation test is a certain means of picking out pregnancy from other conditions, physiological or pathological, but a knowledge of its nature and technique is essential for the medical man who wishes to be abreast of the latest scientific views of the processes of reproduction and of the means of detecting gestation in its earliest months.

Text-Book of Physiology. By W. H. HOWELL, M.D., LL.D. Fifth Edition. Pp. 1020. Philadelphia and London: W. B. Saunders Co. 1913.

HOWELL'S well-known text-book holds a high place in the esteem of both teachers and students of physiology. The present edition has been carefully revised and brought up to date, and a good deal of new matter has been incorporated, especially in the section on metabolism. We might suggest that the account of the leucocytes might be rewritten with advantage, and that some notice of Edridge-Green's views on colour vision would be much more useful than the unenlightening theories of Young, Hering, and Franklin. It is not a little remarkable that a text-book on physiology should reach a fifth edition without including an account of voice production.

A Manual of Ambulance. By J. SCOTT RIDDELL, M.V.O., M.A., M.B., Ch.B. Sixth Edition. Pp. 254. With 217 Illustrations. London: Charles Griffin & Co., Ltd. 1913. Price 6s. net.

THIS new edition of a *Manual of Ambulance* can be confidently recommended to members of voluntary aid detachments; it should also serve as a useful and complete guide to lecturers on the subject. A new chapter describes the work of voluntary aid detachments and their relation to the medical service of the territorial force. Altera-

tions and additions to the text have been made, particularly in the sections on artificial respiration, electrical accidents, and ambulance transport. Many new illustrations have also been added.

A Pocket-Book of Treatment. By R. W. LETTWITH, M.D. Second Edition. Pp. 348. London: Edward Arnold. 1914. Price 5s. net. WE hail with satisfaction the appearance of a second edition of this handy little volume. A brief though eminently practical account of such general therapeutic measures as diet, baths, climate, etc., is followed by a résumé, in dictionary form, of the treatment of each disease. Numerous prescriptions are given throughout the text, but the pocket-book is more than a mere formulary, and will undoubtedly prove of great service to the busy practitioner.

NOTES ON BOOKS.

AMONG popular books on the subject, Dr. Otis' *Tuberculosis: Its Cause, Prevention, and Cure* (revised edition, New York, Thomas Y. Crowell Co., 1914, \$1.25 net) will take a high place. It is intended for laymen, and is an excellent summary of the scientific, personal, and social aspects of the tuberculosis question at the present time. It should be widely read.

As usual, the *Transactions of the American Palliative Society* (vol. xxv., American Medical Association Press, Chicago) contains many papers of special interest. At the meeting of which this volume is a record the majority of the papers were on special diseases and cases of importance, and discussions on general subjects, such as feeding, are less in evidence than usual. Most of the articles have already been published in the current journals, but they deserve to be preserved in this convenient form.

The report of a clerical and medical committee of inquiry on *Spiritual Healing* (Macmillan & Co., Ltd., 1914, price 1s. net) has already appeared in the current magazines, and is now published as a separate volume. The inquiry was carried out in a scientific spirit, and the conclusions are temperate and such as must be obvious to most sensible people. A serious committee such as this may do some good in the way of counteracting the present tendency to superstition regarding disease, but we are not very sanguine.

The Anatomy of the Lamb, by J. F. Burkholder, M.D. (pp. 206, with 40 illustrations, Chicago, G. P. Engellhard & Co., 1912). This book is intended as a guide for the student in the dissection of the brain of the sheep. The text is lucid and it incorporates clear instructions for dissection. As a prelude to the study of either the physiology

or the diseases of the nervous system the book is admirable. It should be remembered, however, that the study of the sheep's brain must accompany and not replace the study of the human brain in the curriculum of the medical student.

The Prevention of Dental Caries and Oral Sepsis, by H. P. Pickerill, M.D., L.D.S.(Eng.) (Baillière, Tindall & Cox, second edition, 1914, price 12s. 6d.), is clearly and concisely written, easily read and pleasantly assimilated. The author is to be commended on the logical manner in which he proves his "conclusions." We can recommend this volume to the perusal not only of the dental surgeon and student, but also of the physician who would render prophylactic service to his patients.

Eye, Nose, Throat, and Ear, by James Forrest (Henry Kimpton, 1914, price 10s. 6d.). It is a little difficult to understand the motive which led the writer to produce this volume, considering the great number of reasonably-priced, well-written text-books already on the market. The ocular section contains little that is original. There are many inaccuracies and grammatical errors, and while the chapters on refraction are full of detail, they are too concise to be easily understood. The same faults pertain to the remaining sections. No mention is made of Mammenstiel's treatment for nasal lupus. The labyrinth section is too involved to be understood. The proof-reading has not been very carefully done.

The staff of this *Journal* is not, as we thought, omniscient; the editors can find no one competent to review Dr. Darroch's *Chinese Self Taught* (E. Marlborough & Co., London, price 5s. net). It is a phrase book for students and others, and a handbook for tourists. So far as we have tested it the vocabulary is comprehensive enough for the ordinary purposes of life, and the colloquial phrases are grouped in a practical way. The phonetic system of romanisation of the Chinese characters is adopted. Chinese, we know, is a difficult language: for the "t. i. d." of the barbarian's prescription, the Chinese doctor must say "*dje go yoh ih tien fu san tsz*," which is pronounced "jeh go yo ee tee'en foo san tsz." If we *were* going to China we should, we feel assured, find the book both useful and trustworthy. The author's position as Chairman of the Executive Committee of the Educational Association of China is guarantee enough.

We have received the fourth issue of the *Edinburgh University Medical Year-Book*, a work which we regard as one of the most useful annuals, so far as Edinburgh men are concerned, of the year. In addition to a great deal of information about what has taken place in the Edinburgh Medical School during the past twelve months, it contains a directory of graduates, and records of the doings of Edinburgh University Clubs all over the world. The production of this *Year-Book* has been, we know, a labour of love to Mr. Fitzwilliams, and

entailed on him much labour and no little pecuniary loss and responsibility. So useful has the venture been, that in future the annual is to be managed by the University. Professor Littlejohn's appreciation of the editor's work is well merited, and we feel sure that his appeal for contributions to put the *Year-Book* on a sound financial basis will not fall on deaf ears. Small contributions will suffice, and should be sent to the Dean of the Faculty of Medicine, at the University.

The publishers of the well-known Students' Aid Series have secured the services of Dr. Aitchison Robertson in revising the eighth edition of the late Sir William Murrell's *Text-Book of Forensic Medicine and Toxicology* (London, Baillière, Tindall & Cox, 1914, price 2s. net). The text has been brought thoroughly up to date, and the book should certainly prove useful to the student preparing for an examination. This series of books has always been most successful, despite the small size of the volumes, in avoiding degenerating into mere cram books—a fact which is due, probably, to the high standing of their authors.

BOOKS RECEIVED.

- ANDERS, J. M., and L. N. BOSTON. A Text-Book of Medical Diagnosis. Second Edition. (W. B. Saunders Co.) 25s.
- ASHHURST, A. P. C. SURGERY: Its Principles and Practice. (H. K. Lewis) 25s.
- BALLENGER, W. L. Diseases of the Nose, Throat, and Ear. Fourth Edition. (H. K. Lewis) 25s.
- BALDWIN, J. S. The Basis of Health and Disease. (H. K. Lewis) 25s.
- CAIRD, F. M., and C. W. CATHCART. A Surgical Handbook. Sixteenth Edition. (Griffin & Co., Ltd.) 8s. 6d.
- COOKE, W. E. The Nuclear Changes in the Neutrophile Polymorphonuclear Leucocyte in Primary Typhoidosis. (H. K. Lewis) 1s.
- COOKE, W. E. The X-Ray in Primary Typhoidosis. (H. K. Lewis) 1s.
- CRESSWELL, L. Oryzoid and Cancer. (H. K. Lewis) 1s.
- CRILE, G. W. Anaemia and Resuscitation. (Appleton & Co.) 21s.
- CRILE, G. W., and W. E. LOWER. Arterio-Aneurysm. (H. K. Lewis) 15s.
- CURGENVEN, J. S. The Child's Diet. Second Edition. (H. K. Lewis) 2s. 6d.
- DAVIES, H. M. A Manual of Minor Surgery and Bandaging. Fifteenth Edition. (H. K. Lewis) 7s. 6d.
- FITZWILLIAMS, D. C. L. Edinburgh University Medical Year-Book, 1914. (Darien Press) —
- FRASER, JOHN. Tuberculosis of the Bones and Joints in Children. (A. & C. Black) 10s.
- GOULD, A. PEARCE. Elements of Surgical Diagnosis. Fourth Edition. (Cassell & Co., Ltd.) 10s. 6d.
- GRAHAM-SMITH, G. S. Flies in Relation to Disease—Non-Bloodsucking Flies. Second Edition. (H. K. Lewis) 15s. 6d.
- HILL, C. A Manual of Normal Histology and Organography. Third Edition. (W. B. Saunders Co.) 10s. 6d.
- HOPE, E. W. Report on the Health of the City of Liverpool during 1913. —
- HOYT, D. M. Practical Therapeutics. Second Edition. (H. Kimpton) 21s.
- JOHNSTON-LAVIS, H. J. Effects of Volcanic Action in the Production of Diseases—and Atmospheric Vicissitudes. (Bole, Sons & Danielsson) 3s.
- JORDAN, E. O. A Text-Book of General Bacteriology. Fourth Edition. (H. K. Lewis) 25s.
- KAPLAN, D. M. Serology of Nervous and Mental Diseases. (W. B. Saunders Co.) 15s.
- KENWOOD, H. R. Public Health Laboratory Work. (H. K. Lewis) 10s.
- LANE, W. ARBUTHNOT. The Operative Treatment of Fractures. Second Edition. (Medical Publishing Co., Ltd.) 10s.
- LUCIEN-GRAUX. Les Caractères Médicaux dans l'Ecriture Chinoise. (J. Moline, Paris) 4 fr.
- M'KEE, J. H., and W. H. WELLS. Practical Pediatrics. 2 Vols. (H. Kimpton) £2, 10s.
- MERICIER, C. A. A Text-Book of Insanity. (G. Allen & Unwin) 7s. 6d.
- MILLARD, C. K. The Vaccination Question in the Light of Modern Experience. (H. K. Lewis) 6s.
- MOTT, F. W. Nature and Nurture in Mental Development. (John Murray) 3s. 6d.

- MUMFORD, J. G. *The Practice of Surgery*. Second Edition. (W. B. Saunders Co.) 30s.
- NILES, G. M. *The Diet and Medical Treatment of Digestive Diseases*. (H. K. Lewis) 21s.
- PHARMACOPEIA of the Hospital for Diseases of the Throat, Nose, and Ear (Golden Square).
Seventh Edition (J. & A. Churchill) 2s. 6d.
- PRACTICAL Medicine Series (1914). Vol. I. General Medicine (J. & A. Churchill) 40s. 1.50
- PRACTICAL Medicine Series (1914). Vol. III. The Eye, Ear, Nose, and Throat (J. & A. Churchill) 40s. 1.50
- ROVSING, T. *Abdominal Surgery*. (J. B. Lippincott Co.) 21s.
- SHORT, A. RENDLE. *The Newer Physiology in Surgical and General Practice*. Third Edition (J. Wright & Sons, Ltd.) 5s.
- SEHN, C. E. *Nutrition—A Guide to Food and Dieting*. (H. K. Lewis) 5s. 6d.
- STOCKTON, C. G. *Diseases of the Stomach*. (D. Appleton & Co.) —
- SWIETOCHOWSKI, G. DE. *Mechano-Therapeutics in General Practice*. (H. K. Lewis) 4s.
- TAYLOR, E. H. *Operative Surgery—Head and Neck, Thorax and Abdomen* (J. & A. Churchill) 30s.
- THOMPSON, W. G. *The Occupational Diseases*. (D. Appleton Co.) 25s.
- THOMSON, W. H. *A Treatise on Clinical Medicine*. (W. B. Saunders Co.) 21s.
- WARD, G. R. *Bedside Hematology*. (W. B. Saunders Co.) 15s.
- WATSON, D. *Gonorrhoea and its Complications in the Male and Female*. (H. Kimpton) 15s.
- WEBER, HERMANN. *On Means for the Prolongation of Life*. Fourth Edition. (Bale, Sons & Danielsson) 4s. 6d.
- WELLS, H. G. *Chemical Pathology*. Second Edition (W. B. Saunders Co.) 15s.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

The late Sir Henry
D. Littlejohn.

WE are indebted to two very old friends of Sir Henry Littlejohn for the appreciations which appear in another part of this issue. Here it is only necessary for us to express our sincere regret at the passing of yet another of our predecessors in the editorship of the *Journal*.

We are tempted to reproduce part of a letter written more than half a century ago by Dr. John Brown, when Dr. Littlejohn was appointed Medical Officer of Health for the city. Time proved the wisdom of the Town Council's choice.

"October 1862.

"Since I last wrote we have got a medical officer of health. . . . Dr. Littlejohn, who has for several years been the police-surgeon, has been appointed our—*nurse* is the best word. This gentleman has, during his occupation of a very difficult position, gained the good opinion and confidence of his professional brethren to a very remarkable degree. Perhaps few of your readers know what the duties of such an officer are in Scotland. They are so numerous that I can only remember a few of them. As Lord Dundreary would say, 'They're what *no* il'low can understand'; but they involve doctoring sick policemen and women, examining cases of sudden death, trying to determine whether the few babies found every morning in the common stairs were born alive, or whether the knot-laces round their necks were congenital, in the strict sense of that word. Should an accident happen, this ubiquitous doctor must be there; should a murder case be tried, Dr. Littlejohn's evidence is anxiously listened to, as it is always cautious and to the point; should there be a difficulty as to whether Sandy McPherson cut his own throat, or his friend, Lauchlan, did it for him after their tenth tumbler, our police doctor soon settles the matter. If innocent, Lauchlan may drop the alcoholic tear in peace over his clansman's bier; if he did happen to divide Lauchlan's weasand, not one of our many insurance officers would accept his life if this active doctor gets anything like a fair chance at him. But, joking apart, although few believe that one man can perform the duties of police-surgeon and health officer at the same time, the bull is the Town Council's, not mine, all agree that, if anyone can, the right man has been selected; and if the arrangement is found not to be successful, that will always be a comfort."

CASUALTIES.

KILLED in action at the front on 26th September, Lieutenant JOHN CROCKET, M.D., R.A.M.C., aged 28.

Lieutenant Crocket graduated in the University of Edinburgh in 1908, and after acting as House-Surgeon in the Royal Infirmary, the Royal Hospital for Sick Children, and the Chalmers Hospital, entered the Royal Army Medical Corps.

AT Braisne, in France, on the 25th September, of wounds received on the 21st, Captain HARRY SHERWOOD RANKEN, M.B., Ch.B.(Glasg.), M.R.C.P.(Lond.), R.A.M.C.

Captain Ranken graduated in the University of Glasgow in 1905. It is reported in the daily press that he was recommended for a Victoria Cross.

LOST with H.M.S. *Hawke*, Temporary Surgeon JAMES HENRY DIGBY WATSON, R.N., M.B., Ch.B. (Edin.), aged 23.

Surgeon Digby Watson graduated in the University of Edinburgh in 1913, and joined the *Hawke* in August last.

ACCIDENTALLY killed, while serving with the 2nd Highland Field Ambulance (Territorial) at Rubislaw, Aberdeen, Captain JAMES D. NOBLE, M.B., C.M.(Edin.), aged 45

The late Lieutenant
J. L. Huggan.

WRITING from the regimental headquarters of the Coldstream Guards, Colonel J. A. G. R. Drummond Hay says: "Yesterday I saw Lieutenant Soames, Coldstream Guards, who has just returned to this country wounded. He was on the staff of the 4th Brigade, to which the 3rd Battalion of this regiment belongs. He is going to write to the Laidlaws (Jedburgh) about Dr. Huggan, as he knows all about him. He told me Dr. Huggan was extraordinarily gallant, and two days before he was killed he was recommended for the Victoria Cross for organising and leading a party of volunteers to remove a number of wounded from a barn that had been set on fire by the German shell fire. The work was carried out under a very heavy shell fire, and all the wounded were saved."

Medical Students and
the War.

THE response which has been given by the students of Edinburgh University to the call of national duty is most gratifying. The number of matriculated students to date shows a diminution of over 700 as compared with last year, and there is every reason to believe that the great majority of these 700 are serving with the

naval and military forces of the Crown. Statistics are not yet available to indicate how these men are distributed among the different Faculties, but it is abundantly evident, from the sparse attendance at most of the medical classes, that the Faculty of Medicine has not been behind its sister faculties in loyalty and devotion. Many of our students were called up with the Territorials on mobilisation, others have obtained commissions in the new army or have joined the ranks, and some have undertaken duties with Red Cross detachments and similar organisations. All honour to those who have made such chivalrous sacrifices for the good of their country.

Our admiration for those who have disinterestedly interrupted their studies to take a part in the active defence of the country in no way reflects on those who for one reason or another have decided to continue their University course. There is at present much useful work that can be done for the State in multi. The time will come when the call of the public services will be for qualified medical men, and so long as the Medical Acts remain in force, these cannot be improvised or hurriedly trained. The aspirant to a medical qualification must go through the statutory period of training and pass the prescribed examinations, and it would not be in the best interests of the country that the former should be curtailed or the standard of the latter lowered. The Navy and the Army, as well as the civil population, demand efficient doctors and a steady supply of them. Already there are signs of shortage, and if the output by the medical schools were to stop even for a year a serious state of affairs would arise.

We are strongly of opinion that students who are within measurable distance of securing their degrees will best fulfil their duty to the country by completing their course. They will then be in a position to offer services of a kind which are urgently required, and which they and they alone can provide. Theirs may seem the less glorious rôle, but if it is honestly played it is not the less honourable.



Graduation Ceremony. A SPECIAL graduation ceremony was held in the McEwan Hall on 16th October, when the Vice-Chancellor conferred degrees on the following:—

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY.

Cedric William Aikman, Scotland; John George Anderson, Ireland; Thomas Henry Stanley Bell, Scotland; Lieutenant, R.A.M.C., S.R.; Prem Nath Berry, India; Thomas Conn Britten, Ireland; Edward Lewis Gordon Brodziak, South Africa; William Taylor Buckan (M.A., St. And.), Scotland; Peter Walter Carruthers, Scotland; Frederick Charles Chandler, England; James Smith Crichton, Scotland; John Dale M.A., Scotland; Fiederik

Johannes Dauth, South Africa; Joseph Dunlop, Ireland; William Forbes Dunlop, Scotland; Harry Herbert Gellert, England; David Charteris Graham, India; Walter William Hallechurch, England; Frederick Waistell Hird, England; Sidney Chantler Huddleston, England; Lieutenant, 3rd Batt. Black Watch, *in absentia*; Maurice Paterson Inglis, Scotland (Lieutenant, R.A.M.C., S.R.); Leslie Fraser Eiloart Jeffcoat, New Zealand; Lazar Lappin, South Africa; George MacLeod Levack, Scotland; John Loftus, Scotland; Egbert Warwick Louw, South Africa; Patrick Thomson Tulloch Macdonald M.A., Aberl., Scotland; William Harold McGranahan, Ireland; Frank Gardyne Milne, Scotland; Wilfrid Westwood Phillips, England; Andrew Russell Ross, Scotland; Harry Priest Rudolph, Jamaica; Abdul Hamid Shaikh B.A., Punjab, India; Clifford Halliday Kerr Smith, Scotland; Petrus Albertus Strasheim, South Africa; Sidney William Herbert Stuart, Scotland; Kenneth Alexander Macdonald Tomory, India (Lieutenant, R.A.M.C., S.R.); John Michael Verster, South Africa; Gifford Traill van der Vijver, South Africa; Johan Frederick van der Westhuijzen, South Africa; Henry Wood Weir, Ireland; James Anderson Young, Scotland.

The diploma in Tropical Medicine was awarded to Kavalam P. Pannikar, M.B., Ch.B.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—Mr. James W. B. Hodsdon has been elected President of the College in succession to Professor F. M. Caird.

At a meeting of the College held on 21st October the following gentlemen, having passed the requisite examinations, were admitted Fellows:—Thomas S. Allen, M.R.C.S.(Eng.), London; Arthur J. Ballantine, M.B., Ch.B.(Edin.), Cape Town; Norman H. Bolton, M.B., Ch.B.(Edin.), Nottingham; Henry H. Davis, M.R.C.S.(Eng.), Glamorgan; Henry E. K. Fretz, L.R.C.S.E., London; William G. Goudie, M.B., Ch.B.(Glasg.), Glasgow; David L. Graham, M.B., Ch.B.(Glasg.), Captain, Indian Medical Service; John D. Gunn, M.B., Ch.B.(Edin.), Edinburgh; Douglas J. Guthrie, M.D. Edin., Edinburgh; Arthur J. G. Hunter, M.D.(Edin.), Linlithgow; John B. D. Hunter, M.B., Ch.B.(Glasg.), Captain, Indian Medical Service; Frederick G. Lloyd, M.R.C.S.(Eng.), London; Richard M. Manwaring-White, M.D. Edin., Cheshire; Francis L. Nash-Worham, M.R.C.S.(Eng.), Edinburgh; John W. Pell, L.R.C.S.E., Hupeh, Central China; Garfield A. Platt, L.R.C.S.E., Ontario, Canada; Edmund L. Reid, M.B., Ch.B.(Aberl.), Banffshire; James W. Richardson, M.R.C.S.(Eng.), Canada; Sydney J. Simpson, M.B., Ch.B. New Zeal., Essex; Leslie J. Thompson, M.B., Ch.B. New Zeal., Feilding, New Zealand; Denis B. Walshe, M.B., B.S. Melb., Thames, New Zealand; Russell E. Walker, M.B., Ch.B.(Edin.), Peterborough; and Walter Q. Wood, M.B., Ch.B.(Edin.), Edinburgh.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND THE ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—

The following candidates, having passed the requisite examinations of the above Board on 3rd October 1914, were admitted Diplomates in Public Health:—Hira S. Anand, M.B., Ch.B. Edin., India; Cromwell Gamble, M.B., Ch.B. Edin., Ireland; James W. Edington, M.B., Ch.B.(Edin.), Dowlan, Coldingham; Stephen B. Rao, F.R.C.S.(Edin.), etc., India; L. P. Chaliha, F.R.F.P.&S.G., etc., India; John H. Beag, M.B., Ch.B.(Edin.), Edinburgh.

INTRODUCTORY LECTURE DELIVERED AT THE OPENING MEETING OF THE CLASS OF PATHOLOGY IN THE UNIVERSITY OF ABERDEEN ON 15TH OCTOBER 1914.

By THEODORE SHENNAN, M.D., F.R.C.S.

WE are living through times more troublous than mankind has ever before experienced. Issues of tremendous importance to all the nations of the world are being decided on the field of battle. We are anxious, as a nation, concerning the success of our arms. We are anxious, as individuals, some about those near and dear, others about close friends and colleagues, who are bravely supporting their country's honour, and risking their lives at the call of their King.

Nevertheless, the sure knowledge that right and justice are on our side helps us to have courage and confidence in the ultimate issue. This belief enables those of us who have to stay at home to carry on duties necessary to Alma Mater and to the State; and it makes possible a gathering of this kind, convened for a purely academic ceremonial—the introduction of a successor in the Chair of Pathology in this University.

When entering upon the duties of an office such as this, one's mind turns naturally to the past, and I should like to occupy a short time in reminding you of the men who had to do with founding this Chair, and with developing its activities.

Prior to 1882, the date of its foundation, only one Chair of Pathology existed in this country—that at Edinburgh. This was founded in 1831, but apparently it did not exert much influence upon medical education until Sanders became professor in 1869.

For some time previous to 1882 the Senatus of Aberdeen University had realised that special tuition in pathology was desirable, and that a department devoted to the subject was a pressing need; but they were hampered by lack of the funds necessary for the foundation of a Chair, and for its proper equipment.

The man to whom a possible way out of the difficulty occurred was William Pirrie, the first Professor of Surgery in the University, and the foremost surgeon of his time in the north of Scotland. His was an interesting personality, and many stories about him, all doubtless more or less highly coloured, are still extant. The "Baron," as he was affectionately termed, from some little mannerisms, as well as from his fondness for recalling his experi-

ences when studying under the great Baron Dupuytren in Paris, was a good enemy and a better friend. His life-long and close friendship with Sir Erasmus Wilson, the famous London dermatologist, was a proof of this; and Professor Pirrie was so sure of Wilson's friendship that he had confidence in asking him to assist this University by giving the funds required for the foundation of the Chair of Pathology, the need for which, one may be sure, had often been discussed between them.

The father of Sir Erasmus Wilson was a native of Aberdeenshire, and a graduate of this University. He became a naval surgeon, and subsequently practised in Kent. He evidently left Aberdeen while Erasmus was still a boy, but nevertheless the latter always preserved a warm place in his heart for his father's Alma Mater. After qualifying, Sir Erasmus spent some years in teaching anatomy, and he made important contributions to the literature of that subject. Thereafter he became assistant-editor of the *Lancet*. It is said that Thomas Wakley, editor of that journal, first directed the thoughts of his junior colleague towards dermatology, in which, as an investigator and as a specialist, he was to win a world-wide reputation. He also developed wide interests outside his profession, as is shown by his love of travel, and by his study of ancient writings and monuments, particularly bearing upon the history of Egypt.

He had a good head for business, and amassed a fortune by practice and from judicious investments.

He was one of those men of wealth who give freely during their lifetimes, and have, as a result, the great happiness and satisfaction of seeing the fruition of the schemes they support, and some of the returns such wise and noble investments afford in ever-increasing benefits to their fellow-men. Sir Erasmus Wilson died in 1884, two years after he founded this Chair.

David Hamilton was appointed first Professor of Pathology in 1882. Aberdeen University was indeed fortunate in securing his services for the organisation and development of the new department.

Hamilton was one of my predecessors as pathologist to the Edinburgh Royal Infirmary and as lecturer in the Extra-Mural School of Medicine; his influence still persists in Edinburgh, where his few surviving students still refer to his share in their education with enthusiasm, esteem, and affection. These men did not fail to inculcate on us, their pupils, and successors as teachers, Hamilton's maxims and lessons.

Hamilton's outlook on pathology was a wide one, and he encouraged, or rather compelled, his students to develop a similar attitude. Professor Sanders did a wise thing when, in 1876, he asked Hamilton to act as his assistant in the University of Edinburgh, so that he might do for morbid anatomy and histology what Hughes Bennett, assisted by Argyll Robertson, had already done for physiology and normal histology. Hamilton's practical and microscopical demonstrations were the things most discussed by the students of that time when talking about their work. They were a revelation of what good teaching is. As Sims Woodhead has said, "Morbid anatomy came to have a new meaning for us. The finished product was no doubt the only thing that came under observation on the post-mortem table, but through histology we were able to trace the early processes associated with disease and link impaired function with altered structure."

Hamilton thus strove to carry out the precepts of Malpighi, who lived two centuries before him, and these were to attempt to correlate the pathological changes discovered after death with the clinical facts observed during life. This was what made him such a fascinating and illuminating teacher, who aroused the enthusiasm of his students.

But Hamilton was not only a morbid anatomist, he was a general pathologist of the best kind. This is shown by his long list of publications in all departments of pathology, which placed him in the very front rank as an original investigator, and gained for him the Fellowship of the Royal Society of London. His prescience is shown by the fact that he was the first to include the practical teaching of bacteriology as part of the course in pathology. There is no room for doubt that the morbid anatomist cannot understand his work unless he is also a bacteriologist, and conversely, the bacteriologist has embarked on many a useless quest because he was not guided by a knowledge of the pathology and morbid anatomy of the disease he was investigating.

It is not so well known as it should be that it was Hamilton who suggested the founding of the Pathological Society of Great Britain and Ireland, a society which has done much for all departments of pathology since it was instituted in 1908.

If I had time I might refer to other aspects of Hamilton's life and work, but Bulloch has already recorded many of these in the Quater-centenary Volume of Reports of this University, so that there is the less need. One thing only I may speak of, and that is the accuracy of Hamilton's data. For many years Hamilton's

measurements remained in use in the Pathological Department of the Edinburgh Royal Infirmary. For example, his measurements of the heart orifices indicated their average diameters in inches. Shortly after I became head of the department I introduced circumferential measurements in centimetres, as tending to increased accuracy, my standard figures being based on many hundred actual measurements. It occurred to me once to calculate the circumferential figures corresponding to Hamilton's averages of diameters, and to reduce the imperial to the metrical standard. I found that our results agreed so closely that only fractions of centimetres separated them. This was enough to convince me that my own results must be very nearly accurate.

I shall not presume to speak of Hamilton outside his work. Most of you knew him better than it was ever my fortune to do; but I may be allowed to say that his too infrequent visits to my department in Edinburgh Royal Infirmary always left behind a feeling of help and encouragement.

May I quote a portion of Professor Ogston's appreciation of him: "Hamilton's influence raised all who came in contact with him. His students loved him, after they had ceased to dread him, and I am sure no student ever went through our medical school without being a better man for having known Hamilton. When the end comes for any of us, it is well, though it be given to few, to leave such a record behind as did Professor Hamilton."

What shall I say about my immediate predecessor, who also was one of my friends? George Dean occupied this Chair for only a little over five years, and died at the comparatively early age of 51 years.

Our University and the whole world of pathological science feel that they have lost a man who by his life-long devotion to science merits a high place on its roll of honour. A graduate both in Arts and in Medicine of Aberdeen, it must have been a great happiness to him to be chosen to succeed his former teacher and close friend. All hoped that he would be long spared to continue the magnificent work which had made his name so well known in scientific circles; but, even as it has turned out, he leaves a record of which all his friends are proud.

In all of the posts he held he did admirable service, in spite of physical disabilities and frequent ill-health.

After spending six years as assistant with Professor Hamilton, during which he laid the foundation of his reputation as a conscientious worker and careful observer, Dean became Super-

intendent of the Serum Department of the British (now the Lister) Institute of Public Health, first at Sudbury and later at Elstree. The new department at Elstree was planned and organised by Dean. Then he was transferred to the post of Bacteriologist-in-Chief to the Lister Institute, a position he held until he became professor here.

All his contributions to medical literature are of great value, and all bear evidence of the careful, thorough, and conscientious nature of his work. While he is best known by his work on the nature of immunity to diphtheria and to plague, and on the preparation of diphtheria toxin and antitoxin, he made important additions to our knowledge of the manner in which the cells of the body resist bacterial invasion, and also of other aspects of the immunity problem. He helped to explain how it is that typhoid fever is spread in the community by individuals who, in complete ignorance of the fact, continue to excrete active typhoid bacilli for many years after an attack of the disease has been apparently recovered from. While investigating a case of this kind Dean was so unfortunate as to contract a severe infection, the effects of which he probably never shook off completely. He also conducted important investigations on the relationship of the bovine and human tubercle bacilli.

But, quite apart from his work, we remember the man himself—approachable, kindly, straight in his dealings, modest, unassuming, yet dignified. I can hardly imagine the man who did not like Dean, or who could not get on with him, for truly he was a friendly man, and his friendships were life-long.

Permit me now to pass on to consider some of the more important ADVANCES IN PATHOLOGY, particularly those which have taken place since the foundation of this Chair.

During the last thirty years pathology has made great strides, and in these advances my predecessors have taken an important share. Moreover, their influence on progress does not begin and end with the work carried out in Aberdeen. We must take account of the other laboratories throughout the Empire, outside of this University, which are directed, or staffed, in whole or part, by old Aberdeen men. From these, contributions of the utmost importance have come, which we are entitled to claim as arising out of the scientific enthusiasm engendered in their authors while still students here. The names of Bulloch, Keith, Ledingham, and Symmers at once spring up in the mind.

It would be futile, and unprofitable, to attempt to trace with

any pretence at completeness the development of pathology in all its branches during the period I have set. The progress has been too great and the advances too numerous for me to give a clear account of them in the time at my disposal. Moreover, we accommodate ourselves so quickly to great advances in our knowledge, and these advances become so soon part and parcel of our individual and corporate life, that we find difficulty in appreciating how novel they are, and in imagining how we attacked the problems of disease and public health without the weapons which recent scientific investigations have placed in our hands.

I would have you realise that advances and discoveries in any science are not dependent on blind chance or fortuitous happenings. Noteworthy additions to our knowledge have no doubt originated from what we call accidents. Such "accidents" have been occurring from time immemorial, but the seeing eye and the trained intelligence have not always been at hand to reveal their meaning and significance. Further, we must acknowledge that the great geniuses of the past—for example the intellectual giants who made such notable progress during the seventeenth century—would long ago have made many of the discoveries which have been crowded into the last thirty years had they possessed the optical, mechanical, and chemical aids which are now available.

As Garrison remarks, "Hardly anyone to-day doubts the theorem sustained by Emile Littré, that the real advancement of biological and medical science has nothing to do with theological dogma or metaphysical speculation, but simply depends upon collateral improvements in physical and chemical procedure. Medicine owes much to the great mathematicians and physicists of the seventeenth and eighteenth centuries, who developed the whole theory of vision and almost the whole physiology of respiration. In the nineteenth century the extension of the three fundamental branches of pure science—biology, physics, and chemistry—has not been surpassed in variety by the work of any preceding age."

We are accustomed to regard great discoveries as the products of genius, and rightly so. But there are degrees of genius, as of other mental attributes, and I would remind you that genius has been defined, not only as an "infinite capacity for taking pains," but also as "highly-developed common sense."

The capacity for taking pains, joined to common sense and the power of observation, make the investigator; and though we may

possess these faculties only to a moderate degree, they can all be developed to a very remarkable extent by the conscientious and enthusiastic worker. Of course without conscience and without enthusiasm one cannot go very far. All this goes to prove that every one of us is capable of turning out good work in our several spheres, some doubtless with more opportunities and more assistance than others, but none of us are wholly bereft of these advantages.

When we glance backwards over the history of medicine we are struck with astonishment at the great progress which has been made with very crude apparatus. For example, most of the tissues were differentiated by means of sections cut with the aid of the razor, either in the fresh condition, or after very imperfect fixation. Staining methods were either non-existent or they were very imperfect, and even in 1882 only a very few reliable methods were in common use. Weigert had introduced the employment of the aniline dyes during the preceding decade, but these were not for a long time applied to any appreciable extent for the differentiation of the tissues.

Up to 1830, when Lord Lister's father made fundamental improvements in microscope lenses, these instruments were very imperfect, and unfitted to resolve fine details of microscopic structure. Though they had been greatly improved by 1882, particularly by French makers, it was not until 1886 that Abbe introduced the improved illuminating apparatus and the oil-immersion objective, which made possible the investigation of the minute structure of cells, and gave a great impetus to the study of the bacteria.

Even with the imperfect apparatus at his command, however, Kircher of Fulda, in the middle of the seventeenth century, was enabled to distinguish minute life in decaying matter sufficiently clearly to afford him a basis for formulating the doctrine of a *contagium animatum* as the cause of infective disease. It was not until two hundred years later that Hense placed this doctrine upon an unassailable foundation.

Swammerdam, a native of Amsterdam, a contemporary of Kircher, discovered the red blood corpuscles. A little later, Leeuwenhoek of Delft demonstrated the capillary anastomosis between arteries and veins, this being only one among countless discoveries he made in many departments of biology. In the same century Malpighi made so many original discoveries in connection with the structure of animal tissues that he is entitled to be

called the founder of histology. But all the discoveries of these men, wonderful though they were in the circumstances, revealed only the coarser structure of the tissues.

Further advances became possible when the microscope was improved, but, as I have already indicated, we had to wait for these until the nineteenth century was well on its course.

In 1838 Schleiden, a botanist, recognised the nucleus as the important feature of the cell, and in the following year Schwann, a professor at Liège and Louvain, discovered nucleated cells in animal tissues. In 1850 Cohn showed that animal and vegetable protoplasm are analogous, if not identical, and in 1858 Virchow announced the continuity of cell development, and its importance in pathology. This last date may be taken as the commencement of modern normal and abnormal histology. Virchow did practically all his staining with carmine or cochineal, which, so far as I know, was the first dye used for this purpose. It had been introduced in 1855 by Gerlach, who also invented some differential staining methods with metallic salts.

Though Purkinje had used a crude variety of microtome for mechanically cutting thin sections of tissue for microscopic examination, it was not until 1866 that a fairly reliable instrument was produced, and it was not perfected until 1875. Paraffin embedding was not introduced until the late eighties.

Hence, though progress had unquestionably been great, and our knowledge of the histological structure of the human body was extensive, it is evident that the date of the foundation of this Chair corresponds to a period of renaissance or revival of research on all kinds of normal and abnormal tissue alterations, this revival having been made possible by improved optical, mechanical, and chemical procedures. This means that during the last thirty years practically all the finer details of microscopic anatomy have been revealed, resulting chiefly in further differentiation of cells and cell structure, which was unattainable by the older methods.

For example, Cohnheim, about the year 1870, had demonstrated that in inflammation the white blood corpuscles emigrate from the circulating blood and travel through the tissues to the focus of disturbance in order to destroy or isolate it, or in case of bacterial infections to attack, and if possible to repel, the invading micro-organisms. But only since the eighties have methods been sufficiently elaborated to permit of the separation of these white blood corpuscles into classes, some of which are active in acute inflammations, while others are found chiefly in chronic inflamma-

tions; some are available for attacking bacteria, some are especially active in presence of animal parasites, or in skin diseases; some act as the first line of defence, others come along later to complete the work.

All our knowledge of the microscopic changes in diseases of the blood and of the blood-forming organs, such as the bone-marrow, belongs to the period under consideration, and most of it dates only from the last decade of the nineteenth and the first decade of the twentieth century.

Attention has also been directed to the fact that the functioning cells of different secreting glands vary greatly in their microscopic characters, and in the same gland at different stages of secretory activity, so that alterations of the minute structure of the cell have come to be associated with functional activity or inactivity. Moreover, in disease the appearances were found to differ in degree from those presented at any stage of normal function.

Again, active cells possessing special characteristics have been discovered in some of the secreting glands which do not appear to be essential to the function of these glands, and thus anatomical proof was gradually collected supporting the theory suggested by Borden in the eighteenth century that not only each gland but each organ of the body is the workshop of a specific substance or secretion which passes into the blood, and upon these the integration of the body as a whole depends. Even before this point was reached attention had been directed towards the glandular organs which possess no ducts, and it was soon realised that, whether their secretions are discharged into the blood or into the lymph-stream, they are of great importance to the human economy, for it was soon found out that pathological changes in these organs of internal secretion are constantly associated with errors of growth and development. Thus, in 1886, Marie associated local gigantism—acromegaly—with disease of the pituitary. A little later, overgrowth of the thyroid was associated with goitre, atrophy of that organ with myxœdema, and congenital absence of it with a closely-related condition, cretinism; changes in the thymus with tetany, disease of chromaffin tissue of the suprarenals with Addison's disease, and so on. This doctrine of *internal secretions*, associated with histological changes in the glands, was extended to the doctrine that the secretions of most organs have an influence upon the function of other organs, and thus the doctrine of the *hormonic equilibrium* of the tissues and organs originated. It

is somewhat awe-inspiring to realise that our bodily development, even our intelligence, depend on demonstrable substances such as these internal secretions, and that in disease they can sometimes be supplied when deficient, or to some extent controlled when super-abundant. It demonstrates the wonderful delicacy of the complex organisation which forms the body of man, a delicately-balanced yet accommodating machine, which is able, within limits, to withstand the foolish treatment to which we so often subject it.

An interesting recent development along the lines I have just been referring to, viz. the attempt to determine the influence exerted by certain organs upon the growth of other organs and tissues, has been in connection with the *Origin of Cancer*. This investigation started from the older theory that in the normal condition there exists an equilibrium or balance between the supporting soft tissues and the glandular secretion, and also the protective, epithelial tissues, and that this equilibrium tends to be lost at certain periods of life, with the result that one set of tissues is liable, by its possessing continued power of growth, to grow into the neighbouring tissues. A theory expounded recently by Italian scientists, particularly by Fichera of Rome, goes further, and holds that certain organs, which are especially active in the young, and during the period of growth and development, exert *governing* influences upon the tissues. This governing influence is lost when these organs in the ordinary course of nature become atrophied and functionless. This phase corresponds to the time of life at which cancer is most prevalent. In order to correct the loss of equilibrium which brings about tumour growth, Fichera injects extracts of the controlling organs obtained during their period of active function, and he reports a considerable measure of success not only in animals artificially inoculated with cancer or suffering from the spontaneous disease, but also in man suffering from the disease.

I should like now to refer to another part of Morbid Anatomy in which our knowledge has been greatly increased within recent years. Although a case of Stokes-Adams' disease, or "heart-block," had been clearly described so far back as 1761 by Morgagni, the mechanism which controls the orderly beating of the heart has been elucidated only during the last few years. The "bundle" of Stanley Kent and Gaskell is now well recognised as the agency which transmits to the ventricle the impulse to contract co-ordinately with the auricle, and a large number of cases in man has been published in which this impulse has been

"blocked" or interrupted by implication of the bundle in disease of the heart-muscle or of the heart-valves. Professor Arthur Keith, one of Professor Hamilton's old students, was able, in collaboration with Dr. Flack, to add to this knowledge; and the *sino-auricular node* of Keith and Flack, composed of primitive muscle tissue, placed near the point of ingress of the large venous trunks into the auricle, is now regarded as having to do with the origination of the impulse to contract, which the "bundle" conveys onwards to the ventricle.

Further, it is now becoming widely acknowledged that, in discovering important and hitherto unrecognised inco-ordinate movements and flutterings of the auricular musculature of the heart, Professor MacWilliam of this University has been a pioneer.

Leaving the consideration of the advances accomplished in the morbid anatomy and chemistry of the body, I wish next to touch briefly upon the even more striking advances made in the fields of bacteriology and serology.

Apart from Pasteur's important investigations in France on fermentation, on diseases of wine, on silkworm disease, and on anthrax, bacteriology was still an undeveloped field when the period under review commences. 1881 saw the introduction by Robert Koch of solid culture media for the isolation of bacteria, and 1882 will be ever memorable as the year in which he announced the discovery of the causal organism of tuberculosis of man and animals. These two discoveries gave a great impetus to bacteriological research, and stimulated other investigators to enthusiastic emulation, resulting in the discovery in rapid succession of other disease-producing micro-organisms, which were also cultivated on artificial media outside the body. Much was soon revealed of their life-histories and of their activities in causing disease, so that within ten years of the foundation of this Chair bacteriology had attained to the dignity of a separate science.

In 1880 the bacillus of typhoid or enteric fever had been discovered by Eberth; in 1883 Klebs discovered the diphtheria bacillus, and in 1884 Löffler cultivated this bacillus. In the latter year, also, Koch discovered the vibrio of Asiatic cholera, and Nicolaier demonstrated the tetanus bacillus. In 1887 Sir David Bruce isolated the bacillus of Mediterranean (Malta) fever.

Now, the diseases caused by this group of bacteria are among the most important that attack mankind.

When the cause of an infective disease has been discovered, the

next step is to attempt to prevent or cure the disease by means directed against the organismal cause itself, or against the toxins or chemical poisons it elaborates and to which the symptoms are due.

Now, the system on which modern methods of combating infective disease are based is that of educating the body to do this for itself. In the school of hard experience, that is to say, in a spontaneous infection, the individual recovers because his cells are stimulated by the presence of the hostile bacterium to manufacture protective substances which are carried by the fluids of the body to every part of it and destroy both the invader and its toxins. Not only that, but a great reserve of these substances remains in the body, and is continually renewed to make up for loss by excretion, so that in many cases the individual is protected for life from the special infection he suffered from.

Edward Jenner, towards the end of the eighteenth century, had introduced into regular therapeutics protective vaccination against the infective disease, smallpox. Pasteur, a few years before this Chair was founded, had discovered by accident that a culture of chicken cholera, whose virulence had been weakened by standing in his laboratory throughout a vacation, when injected into an animal failed to produce the disease; and when at a later date he inoculated the same animal with a virulent culture, he found that the previous injection had protected it from the usual fatal issue. Pasteur extended this observation to other pathogenic bacteria, in particular to the bacillus of anthrax, and in this instance he succeeded in producing a strain of the bacillus with weakened virulence. This came to be used widely as a vaccine, which effectually protected the flocks of his country against the ravages of the disease which was threatening to destroy the sheep-farming industry of France.

One of his pupils (Roux) made the important discovery that the diphtheria bacillus causes disease in virtue of the powerful poison or toxin which it generates in the body, and a few years later von Behring demonstrated that Pasteur's theory of the exaltation and attenuation of viruses could be extended to these toxins they produce. Between 1890 and 1893 von Behring found that if he inoculated animals with weakened diphtheria toxin, the blood serum of these animals could be employed as a protective and curative agent in animals inoculated with the virulent toxin or with the virulent bacilli. In 1894 the treatment was sufficiently perfected to permit of its being applied in cases of the disease in

man. Only those of us who have had experience of epidemics of diphtheria before that date, when we visited child after child suffering from what was in the majority of cases a fatal disease, without our being able to afford much, if any, relief—only those can appreciate fully the value of this therapeutic agent, *antidote*, which has converted diphtheria into an eminently curable disease, provided its presence be detected in time. Hamilton was the first to introduce into the north of Scotland bacteriological methods for the early diagnosis both of diphtheria and of typhoid fever.

Professor Dean's name will always be associated with important improvements in the methods of preparing diphtheria toxin and antitoxin.

The success of diphtheria antitoxin led to many attempts to treat other infections in a similar manner, but, with the exception of tetanus or lock-jaw, antitoxic sera have not fulfilled expectations.

It was well known that attacks of infective diseases other than diphtheria, *e.g.* typhoid fever, protected against a subsequent infection, and in time it became evident that the human body possesses the power of elaborating agencies and chemical substances which are able to defend it against bacteria, apart from their chemical toxins. Metchnikoff, another of Pasteur's pupils, from studies of the changes occurring in inflammation, demonstrated that the white blood corpuscles can absorb bacteria and destroy them, and soon it was found that practically every cell of the body possesses this power to a greater or lesser degree.

Further, it was found that fresh blood serum, without the corpuscles, possesses the power of killing bacteria, particularly if this power has been heightened by a previous infection, or by previous inoculation of the specific micro-organism.

This led, in the hands of Sir Almroth Wright, to the therapeutic employment of killed cultures of bacteria for the prevention and treatment of infective disease, and opened up the field of vaccino-therapy. This agency has proved to be of the greatest value in preventing typhoid, dysentery, and other infections, and also, to a certain extent, in the prevention and treatment of septic wound infections.

Typhoid fever, dysentery, and cholera are diseases which at the present moment concern us very closely, because they are peculiarly liable to attack armies in the field, and, up to the time of the Russo-Japanese War, accounted for far more deaths than

shot and shell. In that war, for the first time, the Japanese reduced the fatalities from typhoid, which is usually the most deadly of them, to greatly less than the deaths from wounds. Where vaccination against typhoid has been systematically carried out and made compulsory, as in the United States, the French, and the Japanese armies, the deaths from the disease have been reduced to one-fifth or one-sixth of the proportion which formerly prevailed. Even more satisfactory results have been attained in the case of smallpox. To all intents and purposes this disease has been stamped out in the German army, as the result of systematic and repeated inoculations of vaccine lymph.

It is important to emphasise this point with regard to vaccination against typhoid, because, although this procedure was introduced in this country, its application is still optional in our own army, though one notes that during the past few weeks an increasing proportion of our troops is voluntarily submitting to inoculation, until the results will soon be equal to those attained by compulsion. The inoculation itself is not dangerous—the discomfort lasts only for two days at the most, the second inoculation, which is required for complete protection, causing very little trouble—whereas the gain is incalculable, not merely in the decrease of serious illness among the men, but even more in the maintenance of the efficiency of the fighting line.

Serums and vaccines of other kinds also possess a special value in time of war. A vaccine is now available and is of considerable efficacy in preventing and treating sepsis in wounds, and an antitoxic serum is in constant use when tetanus (or lock-jaw) threatens. These dangerous complications are particularly liable to follow in cases suffering from shrapnel wounds, in which there is bruising and crushing of the tissues, or where wounds have been soiled with mud or with earth from trenches or from cultivated ground.

The other disease I mentioned was tuberculosis or consumption, in the investigation of which both Hamilton and Dean did much good work, and which has had a very special interest to me for many years.

It is now pretty generally accepted that there are two main strains of the tubercle bacillus—that which attacks man especially, and that which has a special virulence for cattle and other *graminivora*. I think both my predecessors, and certainly I myself, have always, in opposition to Koch's views, fought for the importance of bovine infections in the young, and it is interesting to find that

not only has the last British Royal Commission adopted the same standpoint, but that now reports of investigations carried on by many thoroughly reliable workers, some of very great weight coming even from Berlin, are showing the truth of the attitude we have taken up.

Very few sensible people now have any doubt that the milk of tuberculous cows is dangerous to children beneath the age of 5 or 6 years, and that it causes the disease in large numbers of infants.

There are some who say, "Even granting that probably the majority of infants are infected from bovine sources, it is rather an advantage, because the disease is of mild type, and protects against a subsequent infection from human sources." I would strenuously protest against this pernicious doctrine, and would point to another aspect of the question which occurred to me lately. In all other protective inoculations, directly after the virus is introduced, the resistance of the body is actually lowered for a time—during what Wright termed the "negative phase"—and during this period the individual is even more susceptible than before. After a time the resistance gradually rises, until it exceeds that formerly present. In the case of tuberculosis a similar condition of lowered resistance must follow a primary infection, and this stage is prolonged, because normally the child does not develop the power of combating the bovine bacillus successfully until he is 5 or 6 years of age, as I have already pointed out. Now during these early years, if he has been infected from a bovine source, the probability is that he is fighting against it and is highly susceptible to another infection from a similar source, but he is even more open to infection by human bacilli from any case of phthisis or consumption with which he may come in contact. I have never been able to regard the susceptibility of our children to infection from tuberculous milk as anything other than a danger of the most vital kind, to which all public authorities should be far more alive.

In this short survey of recent advances in pathology I have merely touched the fringe of the great subject. For example, I have said nothing about diseases of the central nervous system, or about the magnificent discoveries in the field of animal parasitology, so many of which we owe to our own Royal Army Medical Corps. I have not referred to the insect carriers of disease, to Flexner's work on infantile paralysis, and on epidemic cerebro-spinal meningitis; nor to anaphylaxis or the "serum disease."

which was first described and explained by Jenner in his treatise on *Vaccination*. I have not mentioned what is perhaps the most important discovery of recent years, that of the *treponema pallidum* of syphilis, nor Ehrlich's introduction of salvarsan for combating that disease. The discovery by Löffler of filterable viruses, indicating that in some infective diseases the causal agents are far too minute to be rendered visible by any means yet at our disposal, the artificial cultivation of animal parasites, and, more wonderful still, the cultivation of animal tissues and tumour cells outside the body, are quite as worthy of attention as the subjects I have chosen to discuss.

The harvest of the last thirty years has truly immensely exceeded that gleaned in any similar period of the world's history. At the present time progress has undoubtedly suffered a grievous check. We all hope that it may not be actually thrown backwards. Surely, in spite of the wickedness of this terrible war, Providence will not permit mankind to lose all the benefits which have been gained for it with so much labour.

NOTES ON FOUR CASES TREATED WITH BÉRANECK'S TUBERCULIN.

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IN the February number of the *Edinburgh Medical Journal* Professor Béraneck published a paper explaining the possibilities and limitations of tuberculin, and, in particular, his own special preparation. I have been using Béraneck's tuberculin in my hospital practice for some time, and feel sure that a note of four somewhat remarkable cases, which were all under treatment about the same time, may be helpful to those who have not yet had personal experience in tuberculin therapy.

The opinion which one usually entertains with regard to tuberculin is its applicability in non-febrile cases, and its relative uselessness in cases in which a swinging temperature is present. I do not propose in this paper to discuss the mode of action of Béraneck's tuberculin, because it is better to seek such information from Béraneck's own publications.

The method by which I have been in the habit of administering Béraneck's tuberculin is that recommended by Sir Robert Philip, and which I originally saw quoted in the *Medical Annual* of 1909.

With Béraneck's original tuberculin, which he terms T. 1, 20, a series of dilutions is made, each succeeding dilution being $\frac{1}{10}$ weaker than the one preceding it. Thus:—

T.Bk.=original solution (T. 1/20); T.Bk.₁=1 : 10; T.Bk.₂=1 : 100; T.Bk.₃=1 : 1000; T.Bk.₄=1 : 10,000; T.Bk.₅=1 : 100,000; T.Bk.₆=1 : 1,000,000.

It is hardly necessary, now that tuberculin treatment is placed on a scientific basis, to refer to the reason for giving the initial dose selected, or to the importance of allowing 5 or 6 days to elapse between each dose. These facts are well known, and the doses administered to each of the four patients may be seen in the short history of each case. It is important to remember that, while an optimum dose may be the one which the physician aims at discovering and giving, the patient will often derive greater advantage from getting doses much smaller than those which would just fail to produce a febrile reaction.

The first case was one in which there were innumerable caseous cervical glands, so extensive as to preclude the possibility of their being removed by operation in the usual way, and X-ray examination demonstrated that the glands extended into the mediastinum.

The second case was a tuberculous pleurisy with effusion, which had persistently resisted other treatment, and in which the swinging temperature—rising sometimes to 100° F., sometimes as high as 101° F.—fell at once after the first dose of tuberculin, and did not rise again above normal.

The third case was that of a boy, aged 13½, suffering from tuberculous glands in the abdomen, attended by a great deal of abdominal discomfort. He had no pyrexia; but his increase in weight, and the general improvement in the condition of the abdomen which followed treatment, were alike remarkable.

The fourth case is interesting, because although under the effect of tuberculin the temperature suddenly ceased to swing, there was certainly no improvement in the patient's condition as regards the tuberculous lesion. It is also worthy of note that, while under tuberculin treatment, the boy started what was proved pathologically to be an extensive miliary tuberculosis, and he died of tuberculous meningitis. Small doses of Béranec's tuberculin, given during the period when the meningitic symptoms were most marked, did not have any effect either in reducing temperature or in alleviating symptoms. This case was obviously a failure: but one may well claim very marked success and benefit as regards the other three, and contend that by no other treatment could the same results have been so happily brought about. I cannot answer the question as to the possible risk of miliary tuberculosis supervening in any case so treated: but I do not believe that the miliary tuberculosis in my fourth case was the result in any way of the tuberculin treatment, but rather that it occurred notwithstanding treatment.

CASE I. *Tuberculous Involvement of Glands*.—Male, æt. 31, clerk, was

admitted to Ward 31, under the care of the late Dr. Gibson, on 20th July 1912, with what was at first taken to be Hodgkin's disease.

History.—Father and mother alive and well; two brothers alive and well. His home is comfortable: he has plenty of good food. For a time the patient was addicted to considerable excess as regards alcohol. Previous illnesses include whooping-cough, croup, pleurisy on two occasions, diphtheria (twice), typhoid, measles, and gonorrhœa.

Present Illness.—Three years ago patient suffered from a "slight swelling" in the right side of the neck, which completely disappeared. In the middle of February 1912 he noticed that his collars were becoming increasingly tight, and then realised that his neck was swollen—especially on the right side. The glands in the neck, now easily palpable, were felt on both sides; and as they increased, patient's general health began to suffer, his appetite became bad, and he had to go home for a rest.

The enlarged glands extended right down to the clavicles, and the percussion note over the sternum, together with the evidence obtained by the X-rays, clearly demonstrated that mediastinal glands were also involved.

Condition before Tuberculin Treatment, October 1912.—The glands in the neck were firm and painless: they did not appear to be adherent, though firmly matted together. There were a few small enlarged glands in the right axilla—firm, painless, discrete—and a smaller number in the left. The spleen was not enlarged, nor could any enlarged glands be made out in the abdomen.

The alimentary system presented no abnormality, excepting that the patient had complained of loss of appetite during the previous few months. The circulatory system was normal. There were no evidences of any pulmonary consolidation, no moist sounds, and no abnormal changes in the breath-sounds in any area. The urinary and nervous systems presented no abnormality.

On the 12th October 1912 the patient was readmitted, under my care, and one of the cervical glands was removed by Mr. Hodsdon, in Ward 16, on the 16th October. The gland removed was soft and caseous, and tubercle bacilli were demonstrated microscopically.

On 1st November treatment with Béraneck's tuberculin was commenced; an initial dose of T.Bk.₆ 0·5 c.c. was administered. On the 7th he had 1 c.c. of T.Bk.₅, and on the 13th 0·5 c.c. of T.Bk.₄. On the 19th November he had 0·8 c.c. T.Bk.₄, and on the 23rd 1 c.c. of T.Bk.₄.

After this date the patient left hospital, but still received tuberculin treatment outside.

On 5th April 1913 the patient returned to the neighbourhood of Edinburgh, and was once more placed under treatment, attending hospital as an out-patient once a fortnight. The doses administered were as follows:—5th April 1913, T.Bk.₅, 0·5 c.c.; 19th April, T.Bk.₅, 0·7 c.c.; 3rd May, T.Bk.₅, 0·9 c.c.; 19th May, T.Bk.₄, 0·1 c.c.; 31st May, T.Bk.₄, 0·3 c.c.; 14th June, T.Bk.₄, 0·6 c.c.; 26th July—patient had been ill and off work for a month, and therefore only T.Bk.₄, 0·3 c.c. was given: 11th August, T.Bk.₄, 0·5 c.c.; 25th August, T.Bk.₄, 0·7 c.c.; 8th September, T.Bk.₃, 0·1 c.c.; 20th September, T.Bk.₃, 0·2 c.c.; 4th October, T.Bk.₃, 0·5 c.c.; 17th October, T.Bk.₃, 0·5 c.c.; 31st October, T.Bk.₃, 0·5 c.c.

On 19th November the patient reached his maximum dose of T.Bk.₃, 0·7 c.c., but it was found that this dose produced headache and some discomfort.

Shortly before treatment ceased his chest was examined, and it was found that there was no evidence of pulmonary tuberculosis to be made out in any

part of the lungs. The glands in the neck were much smaller, and the neck as a whole so much reduced in size that the patient could wear 14½ in. collars, while to begin with, so great was the swelling that no ordinary size of collar was sufficiently large.

Under the treatment the patient put on weight, gaining more than a stone, and his appetite greatly improved.

CASE II. *Tuberculous Pleurisy with Effusion.*—D. G., æt. 16, farm servant, on the recommendation of Dr. Hunter, was admitted first to Mr. Cathcart's and later to my wards on the 17th August 1913.

In March of the same year, following exposure to cold, he developed pneumonia and pleurisy, from which apparently he never completely recovered. He remained in bed till June, when he got up, but felt very weak, was unable to work, and could only walk a very short distance.

When first seen he had a slight cough with a little clear sputum. There was pain referred to the right apex on breathing, and on coughing considerable breathlessness. There was profuse sweating at night, but the cough at times completely disappeared, and there was little breathlessness, except on exertion. He had suffered occasionally from attacks of influenza, but with the exception of measles at the age of six, there was no history of other illness.

His family history was good: his father and mother, four brothers and three sisters, were all alive and well. His home surroundings were satisfactory, and work, outside all day, was not hard. His food was plentiful and good.

He was pale and anæmic, and his chief complaint on admission was pain in the left side.

On examining the chest there was an extensive area of dulness on the left side, extending well above the inferior angle of the left scapula. This was obviously due to a pleuritic effusion, and above the level of the effusion there was marked friction. The breath sounds at the right apex were somewhat bronchial in character, with a few suspicious moist sounds. Three days after admission 40 ounces were removed by tapping from the left pleura. It was found to contain numerous lymphocytes. It was almost impossible to obtain any sputum, and neither at the beginning nor at any time during the patient's stay in the ward could tubercle bacilli be found in the expectoration, notwithstanding many examinations.

His temperature, which had been 102·4° F. on admission, swung considerably, rising as a rule to 100° or 101° F. at night, and falling in the morning almost to normal. His pulse on admission was very rapid, but under the influence of digitalis fell to about 90. His breathing, which before tapping was 40 per minute, after tapping remained about 30-35.

On the 26th August another 40 ounces of fluid were removed from the left side, and on the 1st September, and again on the 13th September, almost similar amounts of fluid were removed. About this time a pleuritic effusion also developed in the right side, but it was never large enough to require tapping.

Tuberculin Treatment.—13th October, T.Bk.₆, 0·2 c.c.; 18th October, T.Bk.₆, 0·2 c.c.; 25th October, T.Bk.₆, 0·4 c.c.; 31st October, T.Bk.₆, 0·4 c.c.; 8th November, T.Bk.₆, 0·6 c.c.; 15th November, T.Bk.₆, 0·1 c.c.; 22nd November, T.Bk.₆, 1 c.c.

After the first dose of tuberculin the temperature was practically never above normal, and ceased to swing. His pulse and respirations greatly dimin-

ished in frequency, although the pulse remained as a rule about 90, and the respirations about 23 per minute.

His increase of weight was very striking—12th October, 7 st. $13\frac{3}{4}$ lb.; 20th October, 8 st. 2 lb.; 27th October, 8 st. 2 lb.; 3rd November, 8 st. $4\frac{1}{2}$ lb.; 10th November, 8 st. $8\frac{1}{2}$ lb.; 17th November, 8 st. 12 lb.; 24th November, 8 st. $12\frac{3}{4}$ lb.; 1st December, 9 st. 1 lb.

There was no evidence of any tuberculosis in connection with the alimentary or urinary systems, and there was nothing else in the case specially worthy of note.

On the 1st December 1913 he was sent to Ravenscroft Convalescent Home, and a fortnight later returned to his home in the North, greatly improved both in appearance and in colour by his stay in the country.

When the patient was last examined there were no signs of effusion in either side of the chest, the expansion was good, and although there was naturally some dulness, especially at the left base, no moist sounds could be heard anywhere. The breathing at the right apex of the upper lobe was still bronchial in character.

On several occasions the von Pirquet tuberculin test was applied to the arm and always with a positive result, so that, although tubercle bacilli were never isolated from the sputum, the lymphocytes in the pleuritic exudate, and the moist sounds, with the character of the breathing, especially at the right apex, rendered the diagnosis of tuberculosis absolutely certain.

The sudden drop of temperature following on the tuberculin treatment, and the disappearance of the tendency to periodic rises of temperature at night, were very marked features in this case.

CASE III. Tabes Mesenterica.—W. A., æt. $13\frac{1}{2}$, schoolboy, was admitted to my wards on 7th January 1913 complaining of pain in the "stomach."

Family History.—Mother dead, cause unknown. Is under the care of a stepmother. Four brothers and three sisters, all alive and well. No family history of tuberculosis.

The social conditions are fair. The family live in a room and kitchen, with windows open at night, and food is ample. He has had measles, and was, when 8 years old, in the Sick Children's Hospital with pain in the "stomach," and was retained for five weeks.

Present Illness.—About 3 or 4 days before admission the patient began to suffer from pain after food, beginning, as a rule, half an hour after each meal. The pain lasted for about an hour and a half, and came on in spasms, accompanied by a considerable amount of abdominal rumbling, although he says his pain was chiefly confined to the upper part of the abdomen.

There was a slight enlargement of the cervical glands, stretching from the jaw to the clavicle on both sides. The stomach was not enlarged; the liver and spleen were normal in size. The bowels acted fairly regularly.

The abdomen as a whole was swollen, and on palpation presented a boggy feeling. On careful palpation a mass about the size of a kidney could be felt in the right iliac region. This mass was deep-seated and slightly movable, but was not depressed on respiration. There were several smaller masses, both in the region of the cæcum and also near the sigmoid flexure, and these last were unmistakably enlarged mesenteric glands.

The circulatory system presented no abnormality: the sounds were closed in all areas.

The respiratory system showed a suspicious area of dulness below the right clavicle, where the breathing was somewhat harsh, and expiration was prolonged. On coughing, a few fine, moist sounds could be heard over this region, and the vocal fremitus and resonance were both increased. There was no expectoration, nor any cough.

The urinary system presented no abnormality. There was no pain or frequency of micturition.

The nervous system was normal, excepting that the boy occasionally complained of headache.

On 12th January a von Pirquet test was carried out, and was positive. His weight on admission was 3 st. 12 lb., and his height 4 ft. $\frac{1}{2}$ in.

On the 21st January tuberculin treatment was commenced—

	Tuberculin.	Weight.
21st January	T.Bk. ₄ , 0·2 c.c.	4 st. 2 $\frac{1}{2}$ lb.
27th "	" 0·5 c.c.	4 st. 4 lb.
2nd February	" 0·5 c.c.	4 st. 5 lb.
7th "	" 0·7 c.c.	4 st. 5 $\frac{1}{2}$ lb.
13th "	" 1 c.c.	4 st. 6 $\frac{3}{4}$ lb.
21st "	" 1 c.c.	4 st. 6 lb.
27th "	T.Bk. ₅ , 0·5 c.c.	4 st. 6 $\frac{1}{2}$ lb.
7th March	" 0·8 c.c.	4 st. 6 $\frac{3}{4}$ lb.
14th "	" 0·75 c.c.	4 st. 6 $\frac{3}{4}$ lb.

On the 2nd April he was sent to Gilmerton Children's Home. He was readmitted on 20th June 1913; his height was 4 ft. 2 $\frac{1}{2}$ ins., and his weight—

	Tuberculin.	Weight.
23rd June	...	4 st. 8 $\frac{3}{4}$ lb.
29th "	...	4 st. 9 $\frac{1}{4}$ lb.
1st July	T.Bk. ₆ , 0·5 c.c.	...
5th "	" 0·75 c.c.	...
7th "	...	4 st. 9 lb.
13th "	" 1 c.c.	...
14th "	...	4 st. 9 lb.
20th "	...	4 st. 8 $\frac{1}{4}$ lb.
22nd "	" 1·5 c.c.	...
28th "	...	4 st. 11 $\frac{3}{4}$ lb.
4th August,	...	4 st. 9 $\frac{1}{2}$ lb.
10th "	...	4 st. 9 $\frac{1}{2}$ lb.
17th "	...	4 st. 13 lb.

He was again sent out to Gilmerton Children's Home for a period of 8 weeks and was readmitted to the Royal Infirmary on the 13th November 1913—height, 4 ft. 2 $\frac{1}{2}$ ins.; weight, 5 st. 1 lb.

	Tuberculin	Weight.
15th November	T.Bk. ₆ , 0·5 c.c.	...
24th "	...	5 st. 2 $\frac{1}{2}$ lb.
28th "	" 0·8 c.c.	...
1st December	...	5 st. 4 $\frac{1}{2}$ lb.
7th "	" 1 c.c.	...
8th "	...	5 st. 3 lb.
14th "	" 1 c.c.	...
15th "	...	5 st. 3 $\frac{1}{4}$ lb.
21st "	" 1 c.c.	5 st. 2 $\frac{1}{4}$ lb.

The patient's progress during the administration of tuberculin was very remarkable. His pain completely disappeared, and the various masses already referred to in the abdomen were much less palpable and much smaller in size, while, as a whole, the abdomen had not got the distended, boggy feel it previously had.

When the boy was last seen, at the end of 1913, there was little to indicate that there was anything wrong with him, except a kidney-like mass in the right iliac region, which was still palpable, although much smaller.

The treatment, other than the injections, consisted of cod-liver oil, which seemed to suit very well, and at first mercurial inunction had been used for abdominal massage, but this latter remedy was stopped at an early date, when it was found that the results with tuberculin were so satisfactory. Throughout the several periods of residence of this patient in hospital there was never any temperature and no sweating.

CASE IV. Miliary Tuberculosis; Tuberculous Involvement of the Left Tarsus.—W. J., æt. 15, apprentice engineer.

Family History.—Father and mother alive and well: the only sister died of pulmonary tuberculosis about the age of 20. His home was comfortable, and he slept with open windows, and had plenty of good food.

The *present illness* began in January 1913, when he had what appeared to be influenza with laryngitis. He was first admitted to the Royal Infirmary on the 25th March 1913. On examination, the signs of active pulmonary tuberculosis were not very obvious; there were a few moist sounds at the right apex posteriorly, and the breathing was unsatisfactory over both apices. On the 12th April definite friction was heard at the left base, and there were more numerous moist sounds over the greater part of both lungs. The sputum was always scanty. It was examined on many occasions, but tubercle bacilli were never found. His temperature from the date of admission, and until about the 15th April, was invariably above normal, and almost the whole time he was in hospital there was a definite rise at night often to over 100° F., although latterly the temperature came down below normal during the day. There was a marked improvement of temperature after he was allowed to get up. His weight on admission was 7 st.; it fell to 6 st. 8½ lb., but before he was discharged on 4th June his weight had increased to 7 st. 8½ lb. His treatment during this period consisted of good food, cod-liver oil, and remedies directed to the reduction of his temperature. On several occasions the von Pirquet test was carried out, and it was always positive.

The patient was in Ravenscroft Convalescent Home for 5 weeks after his discharge from the ward, and when he returned his weight was 8 st. 1 lb., and his chest was clear of all moist sounds. He returned to work until 16th November 1913, when he was readmitted to the Royal Infirmary, complaining of severe pain and a swelling over the left foot. A skiagram showed that the cuboid and the external and middle cuneiform bones were affected with tuberculosis, and the joints between these bones appeared also to be affected.

The foot was first treated by Bier's congestion method, but as no benefit resulted, tuberculin injections were commenced—21st November, T.Bk.₆, 0·2 c.c.; 29th November, T.Bk.₆, 0·4 c.c.; 7th December, T.Bk.₆, 0·6 c.c.; 14th December, T.Bk.₆, 0·4 c.c.; 21st December, T.Bk.₆, 0·4 c.c.; 9th January, T.Bk.₆, 0·2 c.c.; 15th January, T.Bk.₆, 0·2 c.c.

After the first injection of tuberculin on 21st November his temperature, which had risen every night to 100° F. or over, dropped below normal, and with the exception of an occasional rise at night, it remained normal until the end of December.

On admission on the 16th November his weight was 8 st. 5½ lb. On the 24th November it was 8 st. 2¾ lb.; 1st December, 7 st. 13½ lb.; 8th December, 8 st. 1¾ lb.; 15th December, 8 st.; 21st December, 7 st. 13¼ lb.; 29th December, 7 st. 11 lb.

It will be noticed that after an initial fall in weight he regained a little under the tuberculin treatment, although this gain was subsequently lost. On the 30th December the temperature began to rise once again at night, and it was thought at first that this was due to the left foot having been placed in plaster of Paris, although a "window" had been made over the swelling.

On the 5th January the left eye was observed to be turned inwards, and it was found that the left external rectus was completely paralysed. There was no diplopia for near vision, although there was for distant. This was the first definite evidence of tuberculous meningitis.

On the 7th January headache developed, with very marked photophobia, and vomiting commenced. The headache became more marked, and was chiefly occipital and frontal in position, and coincidentally the vomiting became much more troublesome. He had a definite Kernig's sign. With the idea of trying to what extent tuberculin in small dose might alleviate symptoms, 0.2 c.c. of T.Bk._g was given on the 9th January. There was no marked result as regards the temperature, and a second dose was administered on the 15th January, but also without any appreciable result. The patient gradually became comatose, with incontinence of urine and feces, and died on the 24th January.

At the *post-mortem examination* (by Dr. James Miller) there was extensive tuberculous meningitis, involving the base of the brain, and most of the nerves at the base were surrounded by thick, purulent-looking lymph. There was no obvious reason why the left 6th nerve should have suffered more than the right, as both nerves seemed equally infiltrated.

There were old pleuritic adhesions, especially over the left base, and recent spread of acute miliary tuberculosis, involving both lungs, and there were numerous small caseous glands at the roots of both lungs.

The left tarsus was examined, and it was found that there was tuberculous involvement of the joints between the cuboid, the external and middle cuneiform bones, and the metatarsal bones of the 5th, 4th and 3rd toes. The swelling was largely due to the infiltration of tendons and tissues with caseous-looking pus, which was deep-seated in position.

In this case it was interesting to note the disappearance of pyrexia which followed the use of the tuberculin, although it was impossible to say that there was any definite improvement as regards the tuberculous involvement of the left tarsus.

THE PASSING OF VESALIUS.

By G. MATHESON CULLEN, M.D., B.Sc.

PART II.—MADRID TO ZANTE.

IN regard to the circumstances attending the departure of Vesalius from Madrid, our sole authority is Clusius. From him we glean a fact of fundamental importance—that Andrew had been dangerously ill and had recovered with difficulty. Of the nature of the disease we are told nothing, although it is suggested that it was caused by his disappointment in not being allowed to leave Spain. But it is the severity of the illness that matters; it is this that makes it the first link in a veritable chain of death. This it was that determined the choice of a pilgrimage, that broke down the opposition of Philip, and almost assured in advance the fatal event. Compostella and Montserrat in Spain, and Loreto in Italy, to mention no others, were renowned shrines attracting multitudes of pilgrims. To visit one or other of these involved sufficient inconvenience and trouble to satisfy the zeal of the most devout. Vesalius, then, must surely have felt the shadow of death about him when he vowed to show his gratitude for recovery by undertaking a pilgrimage which was the most toilsome of all. Herein, too, we find a sufficing reason for the altered purpose of the King. The family of Vesalius had for four generations been bound to the Imperial House by ties of personal service, and his own high regard for Andrew made Philip particularly unwilling to sever this secular connection. But the feeble gait, the hectic flush, the hollow cheek were more convincing than the tongue had been.

With the advance of convalescence, Vesalius would be able to arrange for the suitable settlement of his worldly affairs. This was indeed an essential preliminary to a pilgrimage to Jerusalem, and may be accepted as the popular estimate of the risk involved. As his home was henceforth to be in Brussels, in the ancestral mansion which he had had considerably enlarged and improved, his property, furnishings, etc., in Spain were most likely disposed of at this time. At all events he had sufficient store of ready money to bring a tribe of borrowers to his door. Among these, not the least needy, probably the most importunate, certainly the hardest to refuse, were his fellow-countrymen. The issue is thus recorded by Clusius: "Before he left Madrid he gave loans to some of the young Belgian nobles who were in attendance on the Court, the agreement being that the money was to be repaid him

with large interest (*magno favore*) in Belgium after his return from Jerusalem. One of these gentlemen was the Lord de Selle, who afterwards wedded De Tisnacq's daughter; he got a loan of 2000 gold pieces.²⁴ Surprising as it is to find Vesalius figuring in the always questionable guise of a money-lender, the incident appears to be well authenticated, and further on the real significance of it will be inquired into. This circumstance, it is right to add, is the probable basis of the fantastic version of Metellus. To one who knew that Andrew was to receive money from certain individuals on his return, but who did not know the reason for the payments, it was not a difficult flight of imagination to infer that these were bets, and that the journey had been undertaken to gain them.

At length, his affairs in order, his last will signed, his strength sufficiently restored, Vesalius was ready for the journey, and took leave of his master. As a parting token of his appreciation Philip presented him with a letter issued under the Royal Seal authorising him to pass freely through and leave the Spanish dominions, and expressly forbidding the Customs officers to place the least hindrance in his way. As all the old provinces preserved their separate Customs, this was a great favour for Vesalius, since he would have to run the gauntlet of no less than five sets of these officials before he set his foot in France. The King, in addition, provided a sum of money to cover the expense of the return to Belgium. And so one morning early in March 1564 Vesalius, along with his wife and daughter and their little cavalcade, passed through the gates of the city. The *mise en scene* of the journey must have been pretty much like that with which Cervantes has made the world familiar. Only one authentic detail, pathetic in its triviality, has come down: "They and their belongings were carried on a Belgian coach." This kind of vehicle was still a rarity in Spain, where it first appeared eighteen years previously.²⁵ Naturally its use was restricted to the rich, and even among them only to women and children. No man anxious to retain the respect of his fellows would, without grave excuse of age or infirmity, be seen within this refuge of the effeminate. That Andrew travelled thus is clear proof that his health was even yet far from satisfactory.

Some three weeks later, for so long must this journey of over 500 miles have taken, Perpignan was reached, the Spanish frontier town over against France. At this point Clusius resumes his narrative: "As Wesalius (*sic*) was passing out of Spain at Perpignan,

trouble arose between him and the hirelings of them that farmed the Customs. With these men it was a habit to grievously annoy all travellers from whom they had not received bribes. Wesalius, trusting in the Royal letter, offered no bribe. They planned how to vex him. It is necessary, said they, to unpack and examine all your bags in order to make certain that they do not contain anything beyond what your letter permits. Wesalius, smarting under the affront, summoned them before the magistrates. The case dragged on for a fortnight, and is believed to have cost him nearly 50 gold pieces. All this trouble and loss of time would have been avoided if he had offered these Harpies one, or at most two, gold pieces to start with."²⁴

After this incident, of which more anon, our travellers entered France, but only to separate immediately, and, as it proved, for ever. His wife and daughter, still enjoying the luxury of the coach, and protected by their retinue, turned northward towards Belgium. Vesalius proceeded to Venice, probably by boat to Genoa in the first instance and thence overland, reaching his destination about the third week of April. Here for the moment we leave him busy with his preparations for the pilgrimage, since it is necessary to investigate a sinister rumour against him which seems to have been current at this time, and which took form in the records of Clusius, Metellus, and Solenandar, where it appears as a definite

ALLEGATION OF AVARICE.

"Doch wer möchte an den Geiz Vesals glauben?" asks Roth,⁴³ and so dismisses the whole matter. But whatever we may think, it is certain that some people did believe that Vesalius was avaricious. The real matter of moment is, what were the grounds upon which their belief in his avarice was based? The statement of Solenander (written in 1566) is, according to Roth, practically identical with that of Clusius, and may therefore be considered along with the latter. Metellus (15th April 1565) adduces three proofs²⁰ in support of his assertion that "Vesalius would do anything for money"—(1) he went to Jerusalem in order to win a bet; (2) to save money he travelled with pilgrims and not with merchants; and (3) through stinginess he did not provide enough bread and water for the voyage. Now his first point has been shown to be false, and the second falls with it, for without speculating as to the most appropriate society for a betting man, there will be general agreement that pilgrims are the most suitable company for a pilgrim. As to the alleged insufficiency of supply,

this matter will be fully discussed later ; here it must suffice to say that a satisfactory explanation is available. So far, therefore, as Metellus is concerned, the proofs of avarice utterly fail ; *tabulæ solvantur risu*. Clusius, like Metellus, insists upon the parsimonious supply of food, but he also supports his allegation of avarice by referring to the loaning of money at Madrid and to the troubles with the Customs at Perpignan. It is necessary, therefore, to examine both these incidents in the full light of contemporary facts.

Notwithstanding the fabulous wealth flowing into Spain, through which the courtiers profited greatly, many of the nobles were often in dire straits for money. Expenditure ever tended to outrun income, and where fortunes were easily made the practice of economy had few attractions. As to the Flemings, they held much the same place in Madrid as the Scots did fifty years later at the Court of James I.; rich in ancestry but poor in patrimony, they were come to make their fortune in any way their nimble wits could devise. Among the younger gentry of this sort elsewhere the usual refuge was the professional money-lender. This was not possible in Spain, for the professional money-lender had disappeared with the expulsion of the Jews in 1492. The only hope of accommodation was to be sought at the hands of a kind-hearted friend who had current coin to spare. Under these circumstances the excellent financial position of Vesalius almost inevitably led to solicitation from him on the part of his needy fellow-countrymen. That he consented to lend money was, in contemporary opinion a praiseworthy and charitable action.

But the charging of interest was quite a different matter. This was generally regarded as infamous. The preamble of an English Act of Parliament passed in 1570 declares that "all interest being forbidden by the law of God, is sin and detestable." The whole usury legislation of the Middle Ages was based on this view, which had been transferred from the Jewish Law⁴⁴ and enshrined in the Christian Canon Law. Accordingly the complaint of the nobles that they had been charged interest could have only one meaning to the man in the street—that Vesalius was a miser. So the rumour of his avarice arose.

But however uncompromising the popular opinion might be in regard to interest, the Canon Law prohibition of it was not absolute. This prohibition was based upon the theory, which was as old as Aristotle, that gold was a barren breed of metal ; that from itself

there could come no increase. The unproductivity of gold was indeed so universal that when banks were first established depositors paid for the privilege of having their money safely kept therein.

In particular places, however, owing to the development of commerce, gold began to be productive, and consequently the canonical prohibition of interest was shaken. Thus a loan invested in freighting a ship was entitled not merely to the return of the capital lent, but also to a proportion of the profit as well. In such localities money was no longer barren, and so even a cash loan to a friend could be legitimately burdened with an interest not inferior in amount to what the money would have earned had it been used, say, in trading. This was the case in Spain, where shipping ventures with America had become frequent and very profitable. According to Canon Law, therefore, Vesalius was quite justified in asking interest, and it is inequitable to charge him with avarice on that account.

Still more halting is the proof drawn from Perpignan. Farmers of taxes have from time immemorial served as a synonym for rapacity. In this respect the Customs officers of Spain in the sixteenth century might well have stood for the very pattern of their despicable tribe. Clusius himself refers to them as Harpies. Nicolaus Clenardus⁴⁵ (1566), when speaking of the dangers of travel in Spain, mentions robbers and Customs officials in the same breath, but adds the sarcastic distinction that no one could hope to escape the depredations of the latter. The Ambassador of Henry VIII. complains loudly and frantically of the outrages offered by them to his person and office. So did the envoy of Elizabeth, but the officers grimly said "that if Christ or Sanct Francis came with all their flock they should not escape." If to have trouble with the Spanish Customs were a sign of meanness, then of a surety no liberal soul passed their way.

And thus the unsubstantial fabric of accusation breaks down upon examination. This much at least may be urged in actual disproof, viz., that he recklessly spent large sums in printing and illustrating his *Anatomy*, the financial return from which he must have anticipated would, through the action of the Galenists, be extremely problematical. Paré (1561) merely expresses the honest conviction of contemporaries when he places Andrew's liberality on the same high plane as his diligence: "Wésal, auquel la république est grandement attenne, tant par sa grande diligence que pour les grands frais qu'il a soutenus en l'œuvre de son anatomie."

THE PILGRIMAGE.

And now we return to Vesalius at Venice. His stay there was, it would seem, a very short one, and he had little time for anything beyond his preparations for the voyage. He made a call at Francisi's bookshop, and there he found Gadaldino, Marino,² and several noted physicians whom chance had brought together. The talk eventually turned upon his *Examination of the Observations of Fallopius*, and he explained how the MS. had gone astray and where it then was. Acting upon this information Francisi obtained the manuscript, and it was printed the following month (27th May). Apart from this meeting nothing is known as to Andrew's movements, and we can only assume that he would follow the usual procedure in such cases. Time had been ⁴⁶ when pilgrims assembled in bands of several hundreds and passed in solemn procession through the city before embarking on the special ships provided for them by the State. Now it was seldom that a company of a dozen could be got together, and they had to obtain a passage as best they might on a Levant trader.⁴⁷ Although they were joined together for mutual protection and encouragement, each one jealously kept his own counsel and divulged nothing as to his private position or personal affairs. Everyone wore the roughest, coarsest, and oldest garments, and generally conducted himself as one of the very poorest. This adoption of poverty was an essential devotional feature of all pilgrimages, but in that to the Holy Land it was a practical necessity, since any hint of wealth might be conveyed to the Turks, who would assuredly hold the unfortunate man up for ransom or sell him as a slave. The amount of money carried by the pilgrim was therefore reduced to the lowest figure, but by means of letters of credit to merchants in different localities he would be able to meet any sudden emergency.

Perhaps in no respect was the traveller more certain to suffer than in regard to food. For six gold ducats a month a seat could be had at the captain's table. Four ducats could secure a place at the stewards' table, but the viands here were only what had been left over from the other. In times of scarcity, as after prolonged storms or calms, the food was of the most terrible description—putrid salt meat, worm-eaten biscuit, and stinking water—and all this in such exiguous amount that the pilgrim who provided for himself could not have been worse off. What arrangements Vesalius made we do not know, but it is distinctly stated that he formed a party with other pilgrims, and that in the month

of April he set sail along with Malatesta of Rimini for Cyprus. Arrived here he had the choice of three main routes to the Holy Land—(1) to Jaffa direct; (2) to Tripoli in Syria and thence by sea to Jaffa, or overland via Damascus and the Jordan Valley; or (3) to Egypt and then to Jaffa, or over the Peninsula of Sinai to Palestine. Both Alexandria and Tripoli were terminal stations on the trade routes to the East, and to them were carried from Asia those wonderful drugs and perfumes and spices which Vesalius had written about in his youth and was still anxious to investigate. But the foot of our pilgrim has left no trace here, and all that we definitely know is that he fulfilled his vow and reached Jerusalem.

While he was in the East he was the recipient of an invitation which he must have accepted with particular pleasure. It was nothing less than the offer of his old chair at the University of Padua, with a handsome salary attached. Roth indeed has not been able to find any record of this transaction in the Venetian archives, and would dismiss it as a myth. This drastic action on such negative evidence is, however, hardly justified. It is well known that after the death of Fallopius in 1562 great difficulty was experienced in finding a suitable successor. Lendenara, in 1562, and Prosper Borgarutius, in 1563-64, were merely temporary lecturers, and no permanent appointment was made till Fabricius de Aquapendente was chosen in 1565. It is very likely, therefore, that unofficial representations were made to Vesalius, and that these would have received formal sanction had he returned to Italy.

THE LAST PHASE.

The contemporary descriptions of the circumstances attending the voyage back from the Holy Land are well nigh as conflicting as those relating to his departure from Spain.

"As he had sparingly provided for the needs of his body, the agitation of the waves sickened him, and near the Island of Zante, between Cyprus and Crete (*sic*), in October 1564 he died and was buried."²⁵ (Pantaleon.)

"On the journey back he fell in with George Boucher of Nürnberg, who was returning from Cayro; Vesalius left his own vessel and embarked on board the ship of the latter. For forty days they were driven about by the tempests and were unable to land. Owing to his avarice he had laid in too slight a provision of bread and water. In consequence of this, as well as from fear and anguish of mind when he saw many dying and being cast into the sea, he fell ill, and frequently implored the sailors not to

throw him into the water if he died. At length the ship reached Zante and he landed as soon as possible, but as he was entering the gate of the town he expired. His companion placed a stone over his grave and brought back these tidings." (Metellus.²³)

"On the return journey from Jerusalem he provided food somewhat sparingly, as he anticipated a short and prosperous voyage. It proved, however, longer than was expected, and his provisions ran short, though for shame he tried to conceal the fact. A German noble who was on the ship came to know of his want and liberally helped him. By this time, however, his strength was so undermined that he died shortly after arrival at Zante. He was buried there by his fellow-passengers." (Clusius.²⁴)

"As he was sailing back to Italy he was sorely tossed about by a tempest. Shortly after landing at Zante he fell ill, and there within a wretched hut in a lonely spot, and destitute of all human help, he died. A little while before his death an Italian ship with a Venetian goldsmith on board had anchored near the same place. By good fortune this man took a walk along the shore and came by chance upon the hut where Vesalius lay dying, and, moved by pity, he tried to succour him. But the inhabitants of the island, by nature boorish and totally wanting in humanity, were, moreover, terrified of the plague which was then raging there, and refused to render any assistance. And thus Vesalius died. Only upon the most urgent entreaties was the goldsmith able to get a place for the grave, and even then the corpse would have remained unburied had he not laid it in the ground with his own hands." (Bizaro, 1573.⁴⁸)

Thuanus (1606) is less detailed than Bizaro, but to the same effect. "He encountered adverse winds and landed at Zante. Here in a solitary spot he miserably ended his life in the month of October, having not yet reached his fiftieth year. A goldsmith who landed shortly afterwards recognised him and gave a wretched burial to his corpse, lest it should become the food of wild beasts."²⁵

Miraeus (1609) leaves out the goldsmith, but adheres to the tempest and to the solitary death.²⁶ He is the first to locate the tomb and to give its inscription. "He was buried in the island at the church of St. Mary, and this epitaph was placed over him:—

THE TOMB OF ANDREW VESALIUS OF BRUSSELS,
WHO DIED ON THE IDES OF OCTOBER, MDLXIV.,
AGED 58,

AS HE WAS RETURNING FROM JERUSALEM."

At first sight it is not easy to adjust these conflicting statements,

but closer examination shows that they fall into two categories—that of Bizaro, and that of Clusius and Metellus. The former tells of a storm at sea, a lonely death, and a burial at the hands of a passing goldsmith. The latter detail the storm, but add that Vesalius fell ill through starvation brought on by his own avarice, that he was landed in a dying condition, and was buried by his companions. We have seen that Clusius and Metellus received the allegations of avarice from Flemish nobles or their friends. We are now informed that the story of the return journey was obtained by them from his fellow-pilgrims. It may thus be accepted as being in its main lines authentic.

On the other hand, the authority of Bizaro cannot be lightly set aside. This writer was a native of Italy, but having become a Protestant he withdrew to England, where he stayed some years, and was in high favour at Court. He afterwards returned to the Continent, where he acted as correspondent and agent for the English Government. In his leisure he devoted himself to historical composition. His published works, though not altogether free from religious bias, are so substantially accurate in regard to facts that it is clear that he must have been very careful in his selection of sources of information. His character and attainments also were much above the average, and he was greatly esteemed by his contemporaries. Languetius, himself no mean judge of men, was his enthusiastic admirer, and expressed to Sir Philip Sidney his astonishment that a man of such talent was allowed to leave England. There is thus strong *à priori* grounds for trusting the testimony of Bizaro. Moreover, he himself informs us that he, along with Julius Bargarutius, had the story from the lips of the goldsmith himself. The *bonâ fides* of the latter apparently stood the test of contemporary investigation, and his tale was accepted by Thuanus and others.

But if we leave out the reference to the alleged parsimony, the two seemingly divergent accounts are not altogether discordant, and may be pieced together to form a coherent story which would run somewhat thus: "For his return to Cyprus Andrew, following the usual custom,⁴⁷ had hired one of the small local boats. Before he was able to get away the trading vessel of George Boucher arrived from Egypt, and as it was somewhat larger and much more seaworthy than his own boat he resolved to take passage on it, as also did some of the other pilgrims. Unfortunately the ship encountered boisterous seas and violent winds, so that the voyage was prolonged beyond all ordinary calculation. As a consequence

food and water ran short, and what did remain was unfit to be taken. What with sea-sickness, reduced rations, and the long confinement in a very limited space without fresh air or sanitary convenience, many of the pilgrims fell ill and died, and their bodies were cast overboard. Like the others, Vesalius had exhausted his store, but Boucher came to his assistance in this respect. Nothing, however, could prevent the effects of overcrowding and exposure, and Andrew, who was still only convalescing, grew weaker and more debilitated. At length the storm abated and Zante was reached, where all the passengers landed, overjoyed to get free from their noisome prison. As soon, however, as fresh provisions and water had been obtained, advantage was taken of the settled weather to resume the voyage. By this time Andrew was too ill to be moved, and so he was left in one of the huts along the beach under the charge of some islanders. These wretched hovels were not intended for human habitation, but were really sheds for the temporary shelter of passengers landing on the island. The Venetian garrison was stationed in a castle built on the top of a hill some miles away, and there also the Customs officers were housed. The rest of the island was inhabited by natives, Greek by race and orthodox in religion, who hated the Government and the faith of their masters, the Venetians.

"It was quite in accordance with custom to leave a sick person at a port of call, for obviously it would be impossible to treat him properly on the ship. The lot of Vesalius at Zante was in some respects not the worst that could have happened to him, for the island was on the regular trade route to the Levant, and scarcely a day passed without the chance of a ship calling, and bringing some charitable Christian to his help. Besides, there was, a few miles away, a Franciscan Convent, called Maria Annunziata or Maria della Grazia, and the monks might be expected to tend a co-religionist. Unfortunately plague was then rife, and it is on record⁵¹ with what inhuman rigour cases were dealt with here. It is not surprising, therefore, that the Zantiotes deserted Vesalius in his desperate illness. Just about this time a ship arrived in the roads, and among those who came ashore was a goldsmith hailing from Venice. Casually looking into one of the huts the latter discovered someone lying within, and upon entering he was horrified to find that the sick man was none other than Vesalius. Efforts to obtain assistance were unavailing and meanwhile the patient died, and the duty of burial became urgent. In 1550 Venice had provided a cemetery for Catholics at the Franciscan

Convent, but this was too far to remove the body without help, which was not forthcoming on account of the fear of contagion. The goldsmith had perforce to dig a hole in a piece of ground near at hand and place the corpse therein, otherwise it would have gone unburied."

A few weeks later the news of the death of Vesalius overtook his fellow-pilgrims shortly after their arrival in Venice. Some of these had to pass through Belgium, and some time in December they brought the tidings to his widow in Brussels. As their conduct in leaving Vesalius might be construed to their disadvantage, they said nothing about it, or rather conveyed the impression that they themselves had buried him. Later on the real facts of the case leaked out, and those who were obsessed with the idea of his avarice made the ridiculous inference that his want of provisions was due to his parsimony. Such was the genesis of the story related by Clusius and Metellus.

But the friends of Vesalius determined to raise some slight memorial to his name near the spot where his body lay. The most suitable place was the churchyard of the Franciscan Convent already referred to, and here, in fact, the monument was erected. Christopher Fürers von Haimendorff⁴⁹ actually saw it there on the 4th August 1565, and the inscription he records is the same as that given by Miraens. Too much stress need not be put upon the error of age—58 instead 50—which might easily arise from a mistake in transcription. Over the epitaph was his coat of arms—three greyhounds *or*, in a field *gules*, surmounted by the imperial double-headed eagle. Here, again, the traveller made a slip, since we know that the real coat of arms bore three weasels. This also is of little moment, since to those unskilled in such things it would be difficult to distinguish an heraldic weasel from a conventional greyhound.

The soil of Zante is, however, singularly unsuited for the conservation of monuments. The island is indeed remarkable for the frequency of its earthquakes, through which the Franciscan Church has again and again been cast down. More devastating than any earthquake was the invasion of 1571, when the Turks seized and overran the land, slaughtering all the inhabitants and burning or destroying every building. With such facts in mind it is easy to account for the disappearance of the memorial to Vesalius. As early as 1586 we find Zuallardo⁵⁰ declaring that no vestige of it remained. Two of *Purchas his Pilgrims*, viz. George Sandys⁵¹ and Thomas Coryate,⁵² landed on the island in

1610 and 1613 respectively, and they have left on record a fairly full account of what they saw, but neither heard a word in regard to this tomb. The fact faded so quickly from men's minds that even tradition grew silent. Sixty years ago the Belgian Government, wishing to commemorate their illustrious compatriot, made inquiry in Zante, but the official search through State archives and church records was fruitless.⁵³ There was not a syllable in them relating to Vesalius or his grave.

One of the proposals for the celebration of the four hundredth anniversary of his birth had reference to the erection of a monument to his memory on the soil where his ashes rest. But alas! men's thoughts are so completely occupied with the Armageddon of the present that there is no room for the consideration of so pious and peaceful a project. And yet when all this awful carnage has become merely a hideous memory, and the torrent of human blood has incarnadined the rose and the poppy, may we not hope that the Belgians will turn with renewed ardour to venerate one who was the saviour and not the destroyer of men? But after all it matters little whether the world has one statue more or less, for no monument that artistic skill might erect to Vesalius could compare with his own achievement. His name may fade and his reputation grow dim; his work at least is imperishable. To it may be applied the motto of his choice: *Viritur ingenio, cetera mortis erunt.*

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SIMPLE FORM OF DRESSING STERILISER.

By CHARLES W. CATHCART.

SINCE, at the present time, there is need for all kinds of surgical appliances which can be turned out quickly and at moderate cost, I wish to draw attention to an improved form of the steriliser, working at atmospheric pressure, which I published in this *Journal* in August 1890. The appliance has thus had more than 20 years of trial, and has given complete satisfaction in the hands of surgeons all over the world. The recent improvements add to its efficiency, and reduce its cost. The most important of these improvements consists in a simplified form of drum, which is now in the form of a cube instead of a cylinder. By adopting the cubical form I am able to dispense with the complication of sliding shutters, which were an essential feature of the drums previously used. The cubical box is open at two opposite sides. One constitutes the top; the other is provided with a false bottom of open wire-work, and forms the bottom. Each of these open ends has a detachable cover, which fits equally well upon the open ends or closed sides of the cube. During sterilisation the covers are placed on the sides of the drum, leaving the top and bottom ends completely free for the current of steam to pass



FIG. 1.—Cubical steriliser, showing external aperture for escaped steam, and controlling stop cock opposite the filling hole.

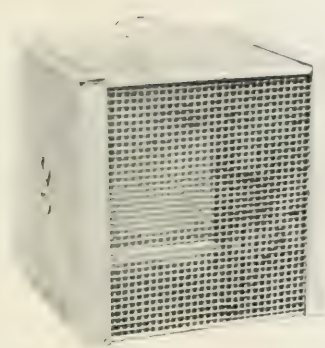


FIG. 2.—Cubical drum laid on one side to show the open wire work forming the false bottom.

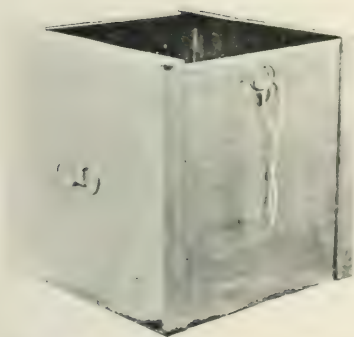


FIG. 3.—Cubical drum with covers fitted on to the sides so as to leave the ends open during sterilisation.



FIG. 4.—Cubical drum with covers in position after sterilisation is completed.

through and through the dressings. When the steaming is finished the covers are replaced in position, and the drum is lifted about by rings at the side.

The steriliser is now also made cubical to suit the drums of corresponding shape. In its essential feature, *i.e.* control of the direction of the current of steam by means of a stop-cock, the steriliser remains as before. I make the steam enter the inner chamber below the central part of the bottom of the drum. In rising up through the dressings to escape above, the steam drives all the air before it, and maintains a through-and-through current as long as the surgeon wishes. Half an hour is all that I recommend—perhaps less would suffice. Owing to the kindness of Dr. McGowan, of the Royal College of Physicians' Laboratory, who conducted the bacteriological inquiry, I find that sporing cultures of anthrax laid in the centre of the drum filled with dressings are killed after half an hour's steaming.

I propose soon to publish elsewhere a more detailed account of the steriliser in its latest form, but am glad of the opportunity of giving an account of its main feature, the cubical drum, in the *Edinburgh Medical Journal*.

The makers, Messrs. Stewart & Co., tinplate manufacturers, 6 Gilmore Place, Edinburgh, are prepared to supply it when required for the purposes of the present war at cost price.

CLINICAL RECORD.

A CASE OF INTRACRANIAL TRAUMATIC ARTERIO- VENOUS ANEURYSM AFFECTING BOTH EYES.

By WILLIAM GEORGE SYM, M.D., and ALEXANDER
MILES, F.R.C.S.

THE following case presents certain clinical features of somewhat unusual interest:—

The patient, a farmer, aged 46, enjoyed good health until the 25th of February 1914, when he met with a serious carriage accident. While driving alone on a country road he was thrown from his trap, landing, so far as he can recall, on the crown of his head. When found he was unconscious, and he remained so for some hours. There was bleeding from both ears and from the nose, and from these and other signs it was believed by Dr. Brodie. Munloch, who attended him, and Mr. Luke, Inverness, who saw him in consultation, that he had sustained a fracture of the middle fossa of the base of the skull. When he regained consciousness he was troubled by a buzzing noise in both ears. A few days later he found that he could not raise his

right eyelid, or move his right eye either to the left or right. Within a week or ten days of the accident a certain degree of protrusion of the right eye became evident, and the conjunctiva began to show marked congestion; these symptoms gradually increased. Coincidentally the vision in this eye, which had previously been good, began to fail, and the eye became quite fixed and immobile. The congestion of the conjunctiva became extreme, and from various points blood began to ooze from time to time. Dr. Wilson Black of Inverness was consulted at this time with regard to the condition of the eye, and the bleeding was so profuse and uncontrollable that he decided to ligate the bleeding points. Under general anaesthesia this was done, but after ligation of the visible bleeding vessels fresh hæmorrhage started from numerous points on the conjunctiva, and it became apparent that further steps would be necessary to check the bleeding, which was menacing the patient's life. Dr. Black was reluctant to sacrifice the eye, which still possessed a certain degree of sight, but as no other alternative presented itself, he performed enucleation and applied firm pressure to the socket. There was no more than the usual amount of oozing from the orbit, and the patient made a satisfactory recovery.

Eight weeks after the accident the patient was able to be about again, and to attend to his duties on the farm, his only complaint being a persistent noise in the head. He again consulted Dr. Wilson Black, who found on examination that the *left* eye was becoming prominent and congested; its movements were restricted, and the patient had difficulty in raising the eyelid. Recognising that a state of affairs similar to what had necessitated the removal of the right eye was being established, Dr. Black brought the patient to Edinburgh to see Dr. Sym.

He was examined on the 13th of May, when it was found that the left eye was protruded to a considerable extent, although from the absence of the other eye it was difficult to estimate the degree, the prominence of the eyes being so variable even in health. The whole conjunctiva was greatly chemosed and congested, both the minuter vessels and the larger trunks being numerous and full. The swollen lids did not meet when the patient attempted to close the eye. The pupil was dilated and did not react to light. On examination of the fundus it was found that there was less hyperæmia than might have been expected from the appearance of the anterior parts, but the main veins were decidedly distended. The globe was almost fixed, but there was a small degree of lateral movement: the upper lid hung down a little, and the globe was somewhat depressed as well as protruded. Vision at this time was $\frac{1}{4}$, but, according to the patient's statement, was falling off. He could not read even large print. It was not possible by moderate pressure to return the globe to the orbit, but there was no hard resistance as of a tumour. The patient complained of great uneasiness, almost amounting to pain, even from slight

pressure over the eye. A very distinct blowing murmur could be heard on placing the ear over the globe of the eye, and with the stethoscope applied over the temporal region a loud bruit, synchronous with the heart beats, was detected. The general condition of the patient was satisfactory, and, apart from the eye symptoms, his only complaints were the constant blowing sound in the head and a persistent headache.

It seemed fairly evident that the condition was to be explained by the development of a traumatic arterio-venous aneurysm on the right side, produced either by a direct tear of the internal carotid and cavernous sinus, or by a splinter of bone resulting from the fracture of the base of the skull. A communication, direct or indirect, between the internal carotid and the cavernous sinus on the right side would explain all the phenomena of the first phase of the patient's illness up to the date of the removal of the right eye. The second phase—the implication of the left eye—would be explained by the aneurysmal pressure telling back on the circular sinus and leading to dilatation of that vessel, and finally coming to affect the cavernous sinus of the left side. The venous return would be impeded, and indeed reversed, in these sinuses by the inrush of arterial blood to them, hence the dilatation of the conjunctival vessels and the protrusion of the eye. The branches of the motor nerves as they passed from the base of the skull to the orbit would be pressed upon by the distended vessels, accounting for the immobility of the eyes. The presence of the blowing murmur seemed to complete the diagnosis.

After consultation with Mr. Miles it was decided that relief was most likely to follow ligation of the right common carotid artery.

Operation.—The operation was performed on 14th May 1914, under chloroform anaesthesia, with preliminary injection of $\frac{1}{4}$ gr. morphin and $\frac{1}{120}$ gr. atropin. A horizontal incision was made opposite the cricoid cartilage, and the vessel secured by a double iodised catgut ligature a short distance below the bifurcation.

Immediately after the patient's return to bed the right side of the face was blanched and cold, but within a quarter of an hour it had regained its colour and was almost as warm as the other side. On recovering from the anaesthetic he at once volunteered the statement that the buzzing sound had gone from his head. He could only distinguish light from darkness. Next morning he could read the time on his watch and was able to distinguish between the nurses attending to him. The prominence of the eye was perceptibly less: he was able to move the upper lid, and the headache from which he had so long suffered had completely disappeared. By the third day after operation some degree of external rotation was possible, but no other movements of the eye could be made: the protrusion of the eye and the engorgement of the conjunctiva were almost gone. At the end of a week the patient said that his sight "was as good as ever."

the left eye was normal in appearance, the range of external rotation was gradually increasing, but it was nearly a week longer before the other movements returned. He was allowed out of bed on the fourteenth day, and returned to his home in Inverness-shire on the twenty-first day. Before leaving, his sight was tested by Dr. Sym and found to be $\frac{6}{6}$.

Subsequent Progress.—Under date 8th October 1914 Dr. Wilson Black writes: "F. is going on very well and does not complain of anything. His wife tells me that 'since coming home he has been very well, and does not complain of headache or noises in the ears or giddiness. He sees very well, and is at his work daily.'"

A similar case was recently reported by Dr. Maher in which Dr. Scot Skirving of Sydney ligated the internal carotid with complete success (*Ophthalmology*, 1914).

OBITUARY.

SIR HENRY DUNCAN LITTLEJOHN, M.D., LL.D., F.R.C.S.E.

THE medical profession in Edinburgh has lost its senior member by the death of Sir Henry Littlejohn, which occurred on the 30th September 1914, at the age of 88.

Not only his age but his long services as a public official in Edinburgh have marked his death as an event which attracted universal attention not only in Edinburgh but throughout Scotland. As showing the mark he had made, his six years of retirement had scarcely lessened the impression which his death has produced. He was born in the year 1826 in Edinburgh, and came of a stock of substantial burgesses. He was educated at the Perth Academy and Edinburgh High School, where he carried off the Dux Medal in competition with Archbishop Maclagan. He studied medicine in Edinburgh, and in the year 1848 he and his life-long friend, Dr. John Smith, were in Paris for a year. At the time he studied in Edinburgh its Medical School contained some of the most brilliant teachers in Europe, and under their influence his mind took a scientific direction, so that it was natural for him to become afterwards a Lecturer on Medical Jurisprudence in the Extra-academical School there. He began his course in 1856 with twenty-three students, among whom was the late Lord Maclaren. In 1858 he had fifty students, and in the eighties often 250 students. Among his students were Dr. Farquharson, Sir Robert Finlay, the late Mr. Asher, Joseph Bell, Lawson Tait, and Sir D. Mackenzie Wallace. Any duly qualified man could then and can now start lecturing on any subject he may select and have his course qualify for the M.D. degree in the University—a rule which has made our Medical School what it is. He inclined to public work rather than to private



THE LATE SIR HENRY LITTLEJOHN

practice, in which, however, he engaged for two years. Up till a few years ago some old people in Selkirk could recall him. In the year 1862 he received the appointment of Medical Officer of Health for the City of Edinburgh. In 1854 he had been appointed Surgeon of Police for Edinburgh. Being the first to hold the Health appointment, he had the great opportunity of laying down the lines of the work to be done, and of forming its traditions.

Public Health as a distinct department of medicine was then almost unrecognised. No doubt some great English physicians, the chief of whom was Chadwick, had realised that the health of the community was suffering greatly from impure water, bad drains, overcrowding, and sanitary sins generally, and that this could be remedied.

In Scotland, it is to be confessed, our great men in medicine had not discerned the urgent need for the study of public health and the application of sanitary laws. Our teachers at that time used to quote the healthfulness of the inhabitants who lived near the Craighentimny Meadows, then irrigated by Edinburgh sewage, and the longevity of the workers in the drains of Paris, as showing that there was no great harm to human life in sewage gases. His appointment not only gave Littlejohn the opportunity of remedying the glaring defects in the health conditions of Edinburgh, but, through his reports, of educating the public mind as to the enormous importance of cleanliness and sanitation. The death-rate of Edinburgh was then 25 per 1000 and in some of the wards 37-46. The closes were indescribably filthy, the drainage was primitive, there were constant and severe epidemics of preventible disease, and the overcrowding was disgraceful to a civilised community. On bringing these facts before the Town Council and the public he was asked in 1865 to make a report on the sanitary condition of Edinburgh. This was an epoch-making event for the city. Its publication made his reputation as a scientific sanitarian, and led to a gradual but steady decrease in the death-rate of the city, which is now down to 14·3 per 1000. It at once placed him in the forefront of that distinguished army of sanitary reformers who have changed the whole conditions of living for the entire civilised world. Britain led the way in this magnificent crusade and the Continent of Europe and America soon followed. When the history of medicine comes to be written this movement will be regarded as one of the most beneficent events in the history of humanity, and Littlejohn's name will take its place as a pioneer.

In the course of his work as Medical Officer of Health, Littlejohn early saw that epidemics of infectious disease could not be properly dealt with until their existence and location were accurately known to the sanitary authorities. He urged on the Town Council of Edinburgh to get from Parliament an Act compelling the notification of every case of zymotic disease to the proper authorities. Such an Act was obtained

in 1879, even in the face of the opposition of the medical profession, the members of which held that such notification interfered with the confidence that should exist between doctor and patient. Edinburgh was the first city to obtain such an Act, but the whole country soon followed its example. It is undoubted that this Act and its effects were Littlejohn's greatest and most original achievements, and entitle him to the gratitude of mankind.

Sir Henry's personality, his mode of doing his public work, his method of teaching, and the way in which he gave evidence before the Courts were entirely his own. He was of spare habit, most alert in his muscular and mental movements, keen of eye, ready in reply, keenly sympathetic or brusque according to his humour, and always business-like in his methods. He was really a great teacher amid a band of the greatest medical teachers in the world. He fascinated and amused his students. His dramatic power was of the first order. No one could tell a humorous story or give an apt illustration better than he. His lectures were never forgotten either by his students of law or medicine. As a *raconteur* he stood out in the medical and general society of Edinburgh, where there were many good story-tellers. He was able to draw upon his immense experience in the Police Court apt illustrations of many of his themes. In fact it was that experience that largely gave his lectures their vividness and practical value. His class was one of the most interesting in the University. No student failed to attend or to listen.

His various appointments make a long list:—Surgeon to the Police, Medical Officer of Health, Professor of Medical Jurisprudence, Medical Adviser to the Crown, Consultant in regard to sanitary matters throughout Scotland, Medical Officer to the Local Government Board of Scotland—such a combination of offices was never held by any man in Scotland and will never be again. He was ever ready to do unpaid work too, such as the Directorates of the Sick Children's Hospital, the Royal Infirmary, and the Cremation Society of which he was vice-president. He seemed to be a universal adviser to the poor when they or their relations got into trouble with the law. To be in his modest office in the High Street and see the way in which he managed his multifarious callers was an education in human nature. As a medical witness in Court perhaps he tended to err in partiality to his own side, but no advocate could put him in a difficulty, and he always had a ready reply to every question by a judge. His appointment to the Chair of Medical Jurisprudence (1897) at the age of 71 in succession to Sir Douglas Maclagan gave him intense gratification, as did the appointment of his son as his successor in the Chair in 1906. He thoroughly enjoyed his title which came in 1895, and it was a pleasant sight to witness the applause that greeted him when the University of Edinburgh conferred on him the degree LL.D. in 1893. He was

successively President of his College, of the Medico-Chirurgical Society of Edinburgh, and of the Institute of Public Health. His friends in law and medicine presented him with his portrait by Sir George Reid in 1907, a fine work of art and a speaking likeness.

He published numerous papers on medical jurisprudence in his earlier years, but lately his writings were chiefly on public health questions, in the form of reports to the Board of Supervision upon the sanitary conditions of various parts of Scotland. In 1855 he was appointed editor of the amalgamated *Edinburgh Medical and Surgical Journal* and the *Edinburgh Monthly Journal of Medical Science*, which post he held for five years, being succeeded by Dr. W. Rutherford Haldane. This *Journal* owes much to him in these years.

It would have been a mistake to judge Sir Henry by some of his outward characteristics. Behind all these there lay a wealth of human kindness, of family affection, of friendship, and religious feeling. This busy man was to be seen daily at the service in St. Giles. To the poor of the High Street he was always an accessible friend. He was always ready to help a brother practitioner. The influence he exerted on the Town Council and on successive chairmen on the Public Health Committee was amazing. The existence of our magnificent City Hospital is an abundant proof of this. "Take him for all in all, we shall not look upon his like again."

T. S. C.

MORE than half a century has passed from the day when I first saw Henry Duncan Littlejohn. I was taken as a boy to witness a criminal trial of a husband who had plied his wife with arsenic, and Littlejohn and another good friend of after years—Douglas Maclagan—were the analysts who brought the murderer to his doom. As I grew up many a time did I see him, passing along with that springy step which marked him out from all other men whom the Mound knew every day. The step was the symbol of the man, always quick, alert, nothing escaping him, seemingly never tired, although always at work. There was no man probably in all Edinburgh who got through a similar amount of varied work, losing not a moment. One can recall how at a consultation, when he felt it should end, he would say, "Well, then, to-morrow at 10 o'clock," and before there was time to answer the office door would be seen swinging behind him, as he and his little black bag disappeared from the room.

His early life plainly marked him out for public service, and when still a young man he became the police-surgeon of Edinburgh. During his long course of duty he must have equalled, if not exceeded, the freedom of the most oath-uttering denizen of the slums, with the difference only that he swore in obedience to the law. Every morning

his visits to the witness-box were not a few, and the evidence he gave was always clear, concise, and to the point. In the Sheriff Court and the Court of Justiciary his appearances were in equal proportion. I remember well the first criminal case in which I was engaged, and in which I learned something of his character and his kindness to young counsel. While his evidence for the prosecution was pointed and telling, any question which was put to him for the defence, and to which he could respond favourably, was stated as freely and distinctly as the prosecutor's points had been given. And in his kindly way he would give such points emphasis. I can recall how when a question was put to him in cross, he would, if he could, give his favourable reply in one word—"Undoubtedly." Then would follow to another question—"Most decidedly." But woe be to you if you had not taken care only to ask where a favourable answer was sure. If he could not be affirmative his negative was telling, though not made more forcible than he could help. As a witness, I have never seen him at a loss. His very full experience, and his knowledge, stored up in a wonderful memory, gave him great power in meeting by telling illustrations the efforts of a counsel to prevail against him.

I have always regretted that when I had to take a course of lectures on Medical Jurisprudence I took the University course, and did not attend Dr. Littlejohn's Surgeons' Hall lectures. I have so often heard of the graphic style of his teaching, and the varied exhibits by which he demonstrated what he taught, that he must have been a model lecturer.

It was a good day for Edinburgh when he was made City Officer of Health. His first report in that office is a classic of sanitary literature. His energetic work in his office has borne much fruit. He found the city with a death-rate that told its own tale of civic inefficiency. When he left office he was able to appeal to the marked diminution of the death-rate, proving that the city had become one of the most healthy in the kingdom. But recently, on one occasion, a death-rate of 10 and a small fraction was recorded. There is no other town of large size in the kingdom which, so far as I know, has ever shown such a figure.

It was a pleasure to me to do what I could to obtain for him the professorship of his own subject which he had so long taught in Surgeons' Hall. His age at the time was the only difficulty, but his friends succeeded in convincing authority that he still had the agility both of mind and body of a man of much less advanced age. No one has ever expressed the idea that our testimony to his fitness was overstated.

Dying as he did, at an age far past the fourscore years, which we are told is only reached by reason of strength, I cannot refrain from recalling what he said to his friends, who a few years ago presented

him with his portrait as a testimony to their friendship. He said that, when a young man, he had been examined by two members of the profession, and had been rejected by them as an uninsurable life. And then, in characteristic quiet tone, he added: "And I had the melancholy satisfaction many years later of attending all that was mortal of these two distinguished gentlemen to their final resting-place."

The knighthood which was bestowed upon him was well earned. Those who knew him as a friend will always remember him with regard. For myself, I can look back on many kindnesses, for which I shall always be grateful.

J. H. A. M.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

W. T. RITCHIE, M.D., EDWIN MATTHEW, M.D., AND
J. D. COMRIE, M.D.

DIAGNOSIS OF LIVER INSUFFICIENCY.

STEIGER (*Corresp.-Bl. f. Schweiz. Aerzte*, Nos. 33 and 34, 1914) considers that many obscure cases of disease are due to functional deficiency of the liver, and suggests some methods which, in his experience, have been useful for their elucidation. Hitherto we have been accustomed to examine the liver simply by the physical methods of palpation and percussion, and by simple chemical methods, such as the search for bile and bile-acids in the urine. As in the case of the kidney, however, recent investigations have shown that certain functions possessed by the liver in health are lessened or abolished when this organ is diseased, so that functional tests of a chemical nature have been introduced. Of these the writer discusses the methods depending on the reabsorption of urobilin, the tolerance for levulose and galactose respectively, the conjugation of camphor with glycuronic acid, and the content of fibrinogen in the blood. The first three of these, in his estimation, are those most easy for the clinician to employ, and at the same time of greatest value. On account of the fact that the healthy liver cells reabsorb from the liver capillaries the urobilin formed in the intestine and carried by the portal vein to the liver, we have a measure of the functioning power of this organ in the amount which escapes the liver cells and is then excreted by the kidney to appear in the urine. Normally only the smallest trace of urobilin so escapes, and the presence of any considerable amount in the urine indicates great loss of functional power in the liver cells. To test the urine for urobilin one adds to some urine in a test-tube two to five drops of 10 per cent. chloride of

zinc solution and then sufficient ammonia to dissolve the precipitate of zinc oxide. If a green fluorescence appears in the filtrate this indicates the presence of urobilin.

For the examination as to the power of tolerance of the system to levulose in the food, the writer uses the method of Hohlweg, administering, according to the severity of the illness, 100, 75, or only, it may be, 50 grammes of levulose in 300 c.c. of milk. The urine is thereafter collected in two-hourly samples for six hours and tested for the presence of levulose. This may be done either by the polarimeter or by boiling the urine with 25 per cent. hydrochloric acid and a little resorcin: if levulose be present there appears either a red colour, or a red precipitate which on addition of alcohol gives a deep red colour. A normal person should be able to assimilate completely 100 grammes of levulose, while in cases where there is interference with the liver function, for instance when a stone is present in the bile duct, levulose may appear in the urine even when so little as 50 grammes have been given. In the similar test with galactose from 30 to 40 grammes of this substance are administered and the urine similarly tested.

COLEY'S FLUID IN TREATING INOPERABLE SARCOMA.

Harmer (*Bost. Med. and Surg. Journ.*, No. 7, August 1914) gives the result of his experience in treating 91 cases of inoperable sarcoma by Coley's fluid (mixed toxin of streptococcus and bacillus prodigiosus). Where possible he injected the fluid directly into the tumour. He excludes from these statistics all cases in which the growth was removed by operation or in which he did not obtain prolonged records, and includes only those where microscopic examination had actually proved the growth to be a sarcoma. This reduces the available cases of sarcoma to 32, and of these ten showed no appreciable effect, in five the growth was softened merely, in other five the growth disappeared but returned, in still other five the primary growth was lost but metastases appeared, in one case the growth diminished in size but remained permanent, while in six cases there was apparently a complete cure. Details are given of these six cases, and the writer draws the following conclusions:—The treatment must be intensive, and the reactions are in some cases very severe. It should be instituted only in cases shown microscopically to be sarcoma, and in which the tumour is irremovable by operation. The percentage of cures may be regarded as varying from 9.4 to 18.8.

COLON STASIS.

Eastman contributes an experimental and clinical study of this subject (*Journ. Amer. Med. Assoc.*, 8th August 1914). He finds that while the strong fibrous embryonal fusion membrane that may pass from the mural serosa to the colon is almost sure to hamper the normal colon movements, the finer vascular adhesions that result from colitis,

and especially from appendicitis, sometimes do, and sometimes do not, cause such interference. These last, he found, were readily brought on by artificial distension of the colon in rabbits, so that when once the condition of colitis has been produced it tends to become more and more aggravated in the manner of a vicious circle. With regard to surgical procedures likely to bring about cure, he does not think that ileo-sigmoidostomy has proved a suitable plan, as the ileum is liable to become dilated and regurgitation of feces from the rectum into it takes place. On the other hand, he holds that drainage of the lower part of the cæcum by anastomosis of it with the pelvic colon cannot produce regurgitation, but, by relieving the cæcum from constant over-distension, enables the ascending colon to resume its normal functions.

Bonifield (*ibid.*) records the effect upon the general health of ileo-sigmoidostomy in several cases after an interval of several years since the operation. He considers that the physician is justified in recommending the operation only when Röntgen-ray examination has shown that there is both ptosis of the large intestine and faecal retardation, and also after the maximum amount of improvement attainable by diet, rest, exercise, etc., has been secured. When all other methods have failed he thinks this operation is sometimes useful.

Reed (*ibid.*) deals with the type of stasis due to the presence of a redundant pelvic colon. This part of the large intestine varies greatly in length in different individuals. In some cases where it was functionally normal the writer has seen it as short as 6 inches, while it may reach to 32, or even in some recorded cases to 42, inches. In every case in which by Röntgen-ray examination it was found to exceed 10 inches in length the writer has found that either functional or organic disturbance was due to this redundancy. This condition is frequently, but not necessarily, associated with ptosed and redundant colon. As to the symptoms which the condition may produce, they include constipation, colicky pains, cystitis, ovarian tenderness, and pain in the left upper abdominal quadrant due to traction: on physical examination dullness in the left lower quadrant, with increase of the tympanitic note over the rest of the lower part of the abdomen; and on Röntgen-ray examination about fifteen hours after a large barium meal has been taken, increase and kinking of the sigmoid flexure are the signs upon which the diagnosis rests. Inflammation within the cæcum and external pressure symptoms are apt to ensue, while the writer attributes many forms of systemic poisoning to the stasis that ensues. As to treatment, the writer states that he has found great benefit to ensue from daily massage of the abdomen by the patient while in the Trendelenburg position, the taking of laxative foods, drinking of hot water before meals, and the use of petroleum with meals. If these fail, fixation of the sigmoid or other operative procedure may be adopted.

STUDIES OF SYPHILIS.

Baerlack publishes the results obtained by him (*Journ. Amer. Med. Assoc.*, 15th August 1914) with the sero-enzyme test for syphilis in 200 cases. He considers that in this test, performed after the manner of Abderhalden's ferment reactions with a substratum of gummatous tissue, we have a more certain method of diagnosis than in the Wassermann reaction. In every case of tabes examined this reaction was positive, while in 40 per cent. of such cases the Wassermann reaction gave a negative result. Also in nine cases of tuberculosis which had had no symptom or history of syphilis there was a positive Wassermann reaction, while in all of these the enzyme reaction proved negative.

Kingsbury and Bechet (*ibid.*) speak well of intravenous injections of mercury for the cure of syphilis. They have used both the benzoate and the perchloride, but prefer the latter, administering it in doses of one-sixth to one-third of a grain in distilled water. On an average they gave six injections in each case, by direct injection into a vein, of the solution of this substance, in bulk of about 12 c.m. They state that the result was good and rapidly manifest, and only in a few cases did patients suffer from pytalism or diarrhoea, and that not severely.

Corbus (*ibid.*) has made an extensive examination of the cerebro-spinal fluid in cases where syphilis has been present and after treatment has been reported cured on the strength of a negative Wassermann test. It is now known, largely as the result of Noguchi's work, that infection of the central nervous system, in those cases where it occurs, generally takes place at an early date. By examining the cerebro-spinal fluid of a number of cases of known syphilis which had been treated, and in which the Wassermann examination of the blood-serum was negative, Corbus found that in no less than 18.3 per cent. of the cases the cerebro-spinal fluid still gave a positive Wassermann reaction. This seems to show that even after the blood is apparently free of spirochaetes they may lurk in the central nervous system, so that the patient can at some later date develop parasyphilitic manifestations in the brain and cord.

White (*ibid.*, 8th August 1914) arrives at somewhat similar conclusions from an analysis of 1694 clinical cases of syphilis. He finds, among other things, that out of five hundred tabetics only about 3 per cent. had ever manifested any late cutaneous syphilides, while of those one hundred and seventy-eight who developed general paralysis only 1 per cent. had ever shown cutaneous syphilis.

J. D. C.

SURGERY.

UNDER THE CHARGE OF

J. W. STRUTHERS, F.R.C.S., AND D. P. D. WILKIE, F.R.C.S.

MODERN WAR SURGERY.

UNDER this title Richard J. Behan (*Surg., Gynecol., and Obstet.*, August 1914) gives his experience as surgeon to the Fourth Military Reserve Hospital in Nisch during the recent Balkan War.

The field dressing of most of the wounds consisted in the free application of 5 per cent. tincture of iodine, dry gauze, and adhesive straps or a gauze bandage. For fractures and large infected wounds starch-impregnated bandages are applied, and if a window had been cut in the bandage to admit of the escape of discharge, most of them arrived at the base hospital in good condition. Iodine and alcohol were the means employed to purify the wounds on the removal of the first dressing. In suppurating wounds a wet alcohol compress gave the best results.

Out of 600 unassorted cases coming direct from the field to the wards under the writer's care, the mortality was 2.8 per cent. This was in accordance with the general results in other wards and hospitals in Nisch. This mortality is much lower than in previous wars, and "the only explanation of this decreased mortality must lie in the lessened destructiveness of modern implements of warfare." "Owing to the distance between the fighting divisions of the two armies, bayonet and sabre wounds were very infrequent." Out of 177 recorded cases there were only two bayonet wounds and one sabre wound. No attempt was ever made by probing to locate a bullet. "We were supremely indifferent to the presence or absence of a bullet in the tissues, and sought it only in case it gave rise to pain or inconvenience. . . ." In only 24 out of 177 cases were the wounds severely infected, and these were mostly lacerated wounds due to shrapnel. Non-penetrating wounds were much more liable to infection than penetrating wounds. As hematomas were very liable to become infected, it became the practice to open them up freely and drain them.

"One is surprised at the great preponderance of the wounds of the extremities to those of the chest and abdomen."

With reference to head injuries, it was noted that in those who reached the base hospitals the percentage of deaths was very small. If the bullet has been fired from a distance it may entirely perforate the head and produce little, if any, inconvenience. Diagonal bullet wounds of the skull are more dangerous than are the transverse or antero-posterior. The author is not in favour of operating on all cases of skull injury.

Wounds of the thorax are attended with hæmothorax, and empyema develops in a considerable proportion, especially when the chest has not been entirely perforated and the entrance wound has not completely closed. It is very important to keep the patients quiet for a long period.

Wounds of the abdomen "are so very harmless that a laparotomy is seldom performed, for it seems less dangerous to allow the patient with a penetrating wound of the abdomen to remain in quiet than to institute operative interference." The favourable outcome seems to be due to the very small wounds made by the small-calibre bullet. Careful transport is most essential for men wounded in the abdomen.

The author gives some interesting statistics and cites illustrative cases of various injuries.

PROGRESS IN GENITO-URINARY SURGERY.

In a recent address, H. H. Young of Baltimore (*Amer. Journ. of Surg.*, August 1914) summarises his personal experiences in certain departments.

Cancer of the Prostate.—In his clinic he has found that one in five of the cases that come to be treated for hypertrophied prostate suffers from carcinoma. The diagnosis of the condition in its early stages depends principally on recognising, on rectal examination, the presence of an induration—which is almost stony—with irregular edges, and which does not always implicate the whole prostate. There may be no obstruction in the early stages, and pain is not a marked feature till late in the disease. Hæmaturia, usually considered a characteristic symptom, is not constant: indeed it is more common in hypertrophy than in cancer.

The treatment consists in removing the whole prostate, a cuff of the bladder, including most of the trigone and the seminal vesicles, and the ampulla of the vasa deferentia. Rectal involvement in cancer of the prostate is rare. Young has only met with it in 3 or 4 out of over 200 cases. The technique of the operation is similar to that of ordinary perineal prostatectomy by Young's method.

The results of the operation are not brilliant if we may judge by the author's tentative statement that he "can now collect about thirty cases with a fairly large percentage of apparent cures—several followed over five years."

Tumours of the Bladder.—From a recent study of 118 cases of bladder tumours the author has found that most cases of benign papilloma treated by excision recurred promptly, and nearly always ultimately became malignant. By electrical treatment with high frequency sparks they can be made absolutely to disappear. "Any one who nowadays does a cutting operation on a benign tumour of the bladder is doing wrong, for he is very likely to get a recurrence, and

ultimately, a carcinomatous recurrence." The application of the high frequency spark to the tumour growth causes the patient no pain, while its action on the healthy part of the bladder is painful.

To diagnose between an innocent and a malignant tumour of the bladder with certainty it is necessary to examine a portion of the growth microscopically. This can be obtained by means of the cystoscopic rongeur.

Stricture of the Urethra.—The author is against cutting operations either by external or internal urethrotomy. "With a French filiform bougie and dilating follower it is possible to get through almost any stricture, and generally to cure them without any operation except progressive dilatation."

Stricture of the vesical orifice of the urethra frequently follows chronic prostatitis, and is generally overlooked. It may occur in quite young men. It is possible to pass instruments and dilate from the meatus, but the obstruction usually recurs promptly, and the dilatations do not do any permanent good. Young has devised a "punch operation," which consists in passing a tubular instrument with a fenestra near the inner end, into which the "prostatic bar" drops and is cut off by an inner cutting tube or punch. The operation is only useful when the obstruction is solely at the vesical orifice with no lateral enlargement present.

Cancer of the Penis.—The author recommends an operation which consists in removing the penis in front of the pubis, including the suspensory ligament, prepubic fat, and ligaments and tissues of both groins, including fat and glands, in one piece. It is not necessary to include the bulbous urethra or the crura, or to combine the operation with castration.

DIAGNOSIS OF TUBERCULOSIS OF THE KIDNEY.

From a careful study of this subject G. E. Macklem (*Surg., Gynecol., and Obstet.*, August 1914) comes to the following conclusions:—(1) Catheterisation of the ureters is not called for when the tuberculous lesions about the mouth of the ureter are typically suspicious. (2) Infection of the bladder and ureter is always secondary to the renal condition. (3) Attacks of renal colic, similar to those associated with stone in the kidney and movable kidney, may be due to masses of tuberculous debris passing through an infected and narrowed ureter. (4) In the early stages, the urinary findings in interstitial nephritis and in renal tuberculosis resemble each other very closely. (5) The majority of cases of renal tuberculosis are met with in the right kidney of females between 30 and 40. (6) Bladder, rather than renal, symptoms usually predominate, and tend to mislead one as to the seat of the lesion. (7) Tubercle bacilli are usually not found in the average urine until the appearance of pus. (8) In all cases in which hæmaturia

is the only or most prominent objective symptom, renal tuberculosis should be thought of. (9) Nephrectomy is the only treatment which offers a satisfactory means of dealing with the condition, unless both kidneys are involved.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

G. H. MELVILLE DUNLOP, M.D., AND A. DINGWALL
FORDYCE, M.D.

SPLENIC ENLARGEMENT IN INFANCY AND CHILDHOOD.

DURING infancy the lymphadenoid tissues are very prone to participate in the most varied disturbances, and the intensity of the reaction in these organs is out of all proportion to the exciting cause (*Arch. of Ped.*, July 1914). The spleen is similarly involved in a wide range of pathological conditions, where the manifestations are practically always those of hyperplasia; that is to say, the findings are those of an abnormally palpable or percussible spleen. Holt gives the following figures for the size of a normal spleen:—

At birth	7.7 grms.
„ 3 months	15.5 „
„ 12 „	23.2 „
„ 2 years	38.5 „
„ 3 „	46.4 „

He says that during infancy it is practically impossible to outline the spleen by percussion unless it is enlarged. When moderately enlarged the lower border is an inch or so below the lower border of the ribs; when greatly enlarged it forms a tumour which may nearly fill the left half of the abdomen. An enlarged spleen may be differentiated from other tumours in the left hypochondrium by the following points:—

1. It usually shows some signs of lateral mobility.
2. Its surface is smooth, and it seems superficial just below the abdominal wall.
3. It has a sharp edge, broken by one or more characteristic notches.
4. As it enlarges it extends obliquely downwards to the right and maintains the general shape of a normal spleen.

The following scheme systematises our knowledge of the causes of splenic enlargement in children:—

1. Circulatory disturbances—(a) central, (b) portal.
2. Acute infections—(a) malarial, (b) typhoid.
3. Chronic infections—(a) syphilis, (b) tubercle, (c) malaria, (d) rickets, (e) cirrhosis of the liver, (f) kala azar and other tropical diseases.
4. Blood disturbances—(a) leukaemia, (b) aleukæmic leukaemia,

(c) *anæmia pseudo-leukæmia infantum* (von Jaksch), (d) simple *anæmia*.

5. Idiopathic splenomegaly (Gaucher and Boviard).
6. Parasitic cystic change.
7. Congenital cystic disease.
8. Neoplasms.

The most important circulatory disturbance is chronic passive congestion, which may arise from valvular heart disease, congenital heart disease, emphysema, or be due to some obstruction of the splenic vein or of the portal circulation from thrombosis. The diagnosis of this congestive group is aided by finding symptoms of cyanosis, oedema, or ascites. When the enlargement is due to an acute malarial infection we find the spleen greatly increased in size, very soft in consistence, and of a deep, almost black, colour, which colour is largely caused by malarial pigment. The consistence of the organ is so altered that it may rupture from slight traumatism. Congenital syphilis ranks first amongst the chronic infections and intoxications. Here the enlargement of the spleen is dependent upon the diffuse fibroid change, which may or may not be associated with the formation of gummata. In chronic tuberculosis the splenic enlargement depends upon the development of tuberculous nodules. If the process is sufficiently prolonged, myeloid disease will increase the size and consistency of the splenic tumour. In rickets, though enlargement is rather a constant feature, it is only moderate in degree and is of little real importance. The splenomegaly associated with blood changes offers the most inviting field for research. McCrae found in 13 fully verified cases of leukæmia in childhood that the acute cases belonged to the lymphatic type; the more chronic are generally splenomyelogenous, in which cases the tumour is of enormous size. On section the blood spaces in the pulp are packed with leucocytes, and the more chronic the condition the more marked is the increase in the connective tissue.

In the pseudo-leukæmias the splenic enlargement and the other changes resemble those of leukæmia, without the notable changes in the white count. The *anæmia pseudo-leukæmia infantum* of von Jaksch is by far the most common cause of splenic enlargement in young children.

In general, the most recent trend of work on the subject has been in the direction of replacing the older name of *anæmia pseudo-leukæmia infantum* by *anæmia splenica infantum*, and to consider that while the condition is a secondary one in some degree, and has its cause most probably in some gastro-intestinal disturbance, the clinical picture is definite. Syphilis and rickets are to be considered but as contributory factors. The prognosis is very grave but not hopeless. The treatment is dietetic regulation, iron, arsenic, and possibly Röntgen rays. Idiopathic splenomegaly is a new type of enlarged spleen described by Gaucher and Boviard, which commences in infancy, is slow and pro-

gressive in type, and with considerable secondary enlargement of the liver. It is accompanied by simple anaemia, haemoglobin (60 to 75 per cent.), softening of the gums, with oozing of blood, epistaxis, cutaneous haemorrhages, and icterus. Cystic enlargement of the spleen due to parasites is a rare condition, and is only found in districts where *echinococcus* is common.

The various neoplasms, both primary and secondary, which cause a splenic tumour in adults are rare in children. The sarcomata are the most common, but lymphangiomata are sometimes found.

ACIDOSIS IN CHILDREN.

It is still uncertain whether the condition of acidosis is due to abnormal formation of acid bodies or to incomplete destruction of some intermediary metabolic substance (*Medical Chronicle*, Manchester, May 1914). The condition is accompanied by an increased elimination of ammonia, the nitrogen elimination in other compounds being diminished. Thus the fixed alkali content of the blood and tissues is protected from loss.

The acids are organic in nature, as, though mineral acids do arise in metabolism, they are not sufficient in amount to account for the high ammonia output. In some cases a certain amount of bases other than ammonia may unite with the organic acids, and in these the ammonia output is unreliable—the balance of acids and alkalies must be relied upon. It appears likely that acidosis as a condition can be brought on through imperfect intermediary metabolism of all types of food-stuffs—proteins, carbohydrates, and fats.

Much experimental work has been done on the subject of acid poisoning. Boussingault, in 1850, found that diabetic urines usually contain very large amounts of ammonia. Walter showed that 0.9 gram of hydrochloric acid by mouth *per diem* was sufficient to kill rabbits, and that the CO_2 content of the blood was much diminished. The symptoms of acid poisoning were accelerated, and laboured respiration raised blood-pressure and tumultuous heart action. Later, respiration, blood-pressure, and heart action failed. The fatal result has been explained as due to lessened alkalescence of the blood, with a fall in the CO_2 content and an accumulation of the latter in the tissues, and consequent asphyxia.

From the clinical point of view diabetes is the most important condition connected with the subject of acidosis. Petter, in 1857, first referred diabetic coma to acetone poisoning. Kussmaul, in 1874, distinguished the peculiar clinical features of certain cases of diabetic coma from those described previously as typical of acetonæmia. He concluded that death was not due to loss of oxygen or accumulation of carbon dioxide or acetonæmia. The results of alkali therapy are not such as to support the view that diabetic coma is due to acid poisoning.

In children one of the most important affections put down to acid intoxication is cyclic vomiting. This occurs chiefly in neurotic children at frequent intervals, without any previous dietetic error. The vomit may contain mucus, blood, bile, acetone, or indol. There is little pain but great prostration. The attack usually lasts a few days and then passes off, but may be rapidly fatal. Before the attack there may be acetone in the urine. The urine decreases in amount during the attack and then contains much acetone and perhaps albumen and blood. The condition has been thought to be a gastric neurosis, but is usually considered a form of acid intoxication. However, the amount of acetone is not large, and the dyspnoea not altogether like that of acid coma.

The good effects of alkali treatment are not constant, and other methods have given equally good results. Apart from this recurrent type, it has been shown that the ordinary gastro-enteritis of children is associated with the presence in the urine of acetone bodies. Keller points out that the increase of the ammonia content of the urine may be due to the disordered function of the liver. It is known that in gastro-enteritis the liver does become degenerated, and in Keller's autopsies in such cases he found a high grade of fatty degeneration of the liver, corresponding with the amount of ammonia which had been found in the urine. Keller tried the effect of feeding infants on diets high in proteins, carbohydrates, and fats respectively. He found that proteins had the least effect on the ammonia excretion, and that carbohydrates had the effect of increasing it only a little. With a fat-rich diet the ammonia nitrogen proportion became very high, and the figure could be regulated by increasing or decreasing the amount of fat, though not to an unlimited extent. The increase in the ammonia elimination may be due either to increased formation of acids or decreased powers of oxidation. The importance of these facts lies in this, that with a fat-rich diet the body is forced to supply ammonia for the neutralisation of acids, and to make use of a power of protecting itself which it does not normally use, and which we have no reason to believe is unlimited.

(G. H. M. D.)

MENTAL DISEASES.

UNDER THE CHARGE OF

JAMES MIDDLEMASS, M.D., AND DOUGLAS M'RAE, M.D.

THE PATHS OF INVASION OF DEMENTIA PRECOX.

AN important paper on this much-debated subject has been contributed by Dr. Masselon (*L'Enceph.*, April 1914, p. 312). In his introduction he remarks that Kraepelin has modified his views with each new edition of his book, and that this renders criticism specially difficult.

It is pointed out, however, that these changes are in details and not in principles. The main characteristics of the disease remain as they were, but minor difficulties are becoming recognised in connection with a number of cases, included by some under the heading of *Dementia Præcox*, by others under one or other of nearly related classes. Of these Dr. Masselon recognises four, which in the long run have to be included in this disease :—

1. Those in which dementia unexpectedly occurs at a premature period of evolution.

2. Those in which symptoms of mental enfeeblement make their appearance after an acute attack, which symptoms have for a time appeared to be those of manic-depressive insanity.

3. Those in which hebephrenic catatonia or mental confusion has ended in more or less dementia.

4. Those in which mental enfeeblement has manifested itself during mania more or less systematised.

These various classes are fully analysed in the paper, and some illustrative cases given. The conclusions he has come to from a careful study of all cases are :—

“That there exist cases in which dementia præcox appears as a primitive process, which has its own symptomatology, its evolution, its termination fully determined : that this evolution proceeds usually with a continuous march ; that, on the other hand, it may advance by successive steps, with intervals of remission more or less long, generally characterised by appreciable mental defect.

“That there exist other cases in which dementia præcox appears as a secondary process, which follows either a certain number of attacks of manic-depressive insanity of an irregular type, or states which, in default of a better name, may be designated by the term hebephreno-catatonia, states which may be looked upon as belonging to the group of toxi-infectious psychoses.”

Dementia præcox is thus a diseased process which is reached by various paths : it manifests itself at times a little different in the evolution of the psychoses. But when once it is present it develops along its own proper path. It is not possible to trace it to unequivocal causes. It is very probably the result of multiple causes—heredity, mental instability, intoxications, and infections. It may be confessed, however, that these conclusions do not carry us very much further in a clear understanding of this apparently protean disease.

J. M.

DERMATOLOGY.

UNDER THE CHARGE OF

W. ALLAN JAMIESON, M.D., AND R. CRANSTON LOW, M.D.

FUNGATING TUBERCULOSIS OF THE SKIN.

ONLY isolated instances of this condition have been noticed since attention was drawn to it by Riehl in 1894. It is likewise as curious as rare. Nanta (*Ann. de dermat. et de syph.*, March 1914) records an example. A man, aged 63, was treated at Saint Louis Hospital for a year. A daughter and a grandson had died of tuberculosis. He first had his attention drawn to a series of enlarged glands. Then there came on his face large patches, which rapidly ulcerated. When admitted there were extensive and increasing ulcerations on the face, scalp, neck, and ears. The rest of the face was red and swollen. The ulcerations themselves were superficial, painful to touch, bordered by pustules and crusts. In spite of treatment the ulceration extended. The commencement seemed to be from sub-epidermic nodules, which grew into deep pustules, then suppurated, leaving a small ulcer, which soon blended with the chief one. It is thus that the huge loss of substance on the face arose, which had wholly destroyed the auricle. Here and there the ulcers cicatrised, to break down afresh. The trunk was invaded by small, red, and indolent nodules, of which some ulcerated. The patient died of cachexia after suffering intolerable pain. Then the whole head was implicated. All parts were enormously swollen. The transition between the healthy and diseased skin was marked by a narrow elevation. The Wassermann reaction was negative. The blood showed only marked anæmia, with a pronounced neutrophile poly-neucleosis. Nothing would have led one to suspect tuberculosis rather than epithelioma or syphilis, yet the bacilli of Koch were found in abundance wherever looked for. The microscopic examination revealed numerous foci of necrosis and a singular arrangement of the lesions in two parallel layers, one of which was dermic, the other hypodermic, separated by a band of healthy tissue. Audry was consulted as to the nature of the case, and regarded it as a form of tuberculosis analogous to lupus elephantiasis.

SULFIDAL, A MODERN SULPHUR PREPARATION FOR THE
TREATMENT OF SCABIES.

In the selection of a remedy for the successful management of scabies, the substance should possess the following properties:—(1) Though applied to a wide extent of surface freely, and so liable to absorption, it must not be poisonous. (2) As far as possible it should be unirritating, clean, and odourless. Of those articles chiefly employed, naphthol may occasion acute nephritis with albuminuria. This is particularly

the case in children, who are apt to suffer from secondary eczema, while in consequence of the tenderness of their skins, absorption is facilitated. Epicaurin, which has been substituted, is not wholly harmless. Both styrax and balsam of Peru may sometimes induce nephritis. As regards the second condition, none of these proves quite unirritating. Sulphur, the most commonly employed, is not poisonous, and destroys the acarus. Yet it smells, is dirty, and irritates, though not badly. Winkler (*Dermat. Woch.*, 22nd March 1913, Hamburg) recommends sulfidal, introduced into medicine by Heyden, as a remedy satisfying the postulations laid down. This is a colloidal sulphur, combined with 25 per cent. of an albuminous body and 25 per cent. of a natural colloid, which aids in preserving the colloid state. The sulfidal gives the best results when mixed with a compound containing glycerine. The mass is spread thinly over the body; in course of a few seconds it dries and clings to the surface. After the first or second inunction the itching abates, the concomitant eczema and pustulation heal under the protection. It is reapplied anew for three or four days in succession. On the fifth day some salicylic vaseline is rubbed on sparingly to remove the sulfidal. In moderately severe cases the patient can be discharged well in eight to ten days. It has no disagreeable odour, does not soil the linen or render the skin greasy, hence it is well adapted for private cases.

SUNBURN.

Exposure to the direct rays of the sun or to their reflection from snow occasions, on the exposed parts of the body, increased redness and even a heat or light erythema, and, finally, certain changes in the integument, such as pigmentation and hardness. Scherber (*Medicin. Klinik*, Berlin, 18th January 1914) has carefully investigated the question, and describes the successive stages of sunburn. He enters fully into the means at our disposal to safeguard from sun and glacier burning. The pigment resulting from repeated exposures forms an essential protection from further trouble. Veils offer a simple method, and yellow, red, and brown have been recommended. In place of veils it has been suggested to besmear the face and hands with varnishes or pastes. Hammer has found that sulphate of quinine suspended in glycerine or glycerine ointment is efficient. The bisulphate, as being much more freely soluble, is preferable. Esculin, a glucoside extracted from the bark of the horse-chestnut, which occurs in white crystals, easily soluble in water, is another good application. It can be employed in a 4 per cent. solution. A derivative of esculin called ultrazeon, made up as a salve in the proportion of 7 per cent., has likewise proved most valuable as a prophylactic. A 4 per cent. solution of bisulphate of quinine or of esculin applied to the face has enabled it to resist an exposure to strong sunlight of from two to four hours without harm.

If glycerine ointment is used as a basis it is more readily washed off than if lanoline is employed. Should the sunburn have occurred, the linimentum calcis provides a grateful application. In severe cases, where blisters have risen, they should be opened and a dilute solution of acetate of alumina applied on compresses while there is pain; subsequently innunction with boric vaseline or borated cold cream.

ECZEMA MARGINATUM OF THE TOES.

Sabourraud has shown that a number of cases that used to be regarded as eczema of the toes are not eczema, but a dermatitis caused by the same cryptogam which gives rise to eczema marginatum of the inguinal fold. This, called by Sabourraud epidermophyton inguinale, resembles, but is not identical with, the ordinary ringworm fungi. It lives exclusively in the epidermis, and its most characteristic habitat is the left inner aspect of the thigh in the male, against which the scrotum rests. It is found also in the armpits, under the breasts in women, and frequently on the front of the foot and between the toes, less often on or between the fingers. Culver (*Journ. Amer. Med. Assoc.*, 4th April 1914) describes a case where a man who had slept with another who had eczema marginatum of the groin became affected there also, and subsequently on one foot. The skin between and under the toes was reddened and scaly, but not moist. The ailment attacked likewise the ball of the foot. The marginal line was wavy, red, and desquamating. On boiling the deeper scales from the margin in liquor potassæ, the branched spore-bearing mycelium of the epidermophyton was demonstrated. This fungus requires air, as well as warmth and moisture, to flourish. In treatment chrysarobin appears to be the most effectual remedy, but till the epidermis was softened this failed to cure. At night a lotion of ten parts of a solution of acetate of alumina was added to a saturated solution of boric acid. This was applied on lint at night, covered with a gutta-percha bag, and secured with a bandage. In the morning a strong salicylic ointment, consisting of twelve parts of salicylic acid in one hundred of vaseline, was rubbed in. When in this way a denudation of the epithelium was obtained, a chrysarobin ointment, made up of chrysarobin 1·5 parts, lanoline and vaseline each 50 parts, was well rubbed in, and this soon cured the disease.

A NEW METHOD OF TREATMENT OF ACUTE ECZEMA.

The treatment of eczema constitutes one of the most difficult dermato-therapeutic problems, for in the majority of cases it is purely symptomatic, as the actual cause of the ailment is frequently hidden. Further, as is well known, no other skin disease exists which, in the variety of its manifestations, can compare with eczema, while for none are so many remedies and modes of management available. To

acute weeping eczema, and to this alone, is reference here made. Samburger (*Dermat. Woch.*, 25th July 1914) recommends the following:—The common mode is to apply stupes moistened with a 1 per cent. solution of resorcin, or $\frac{1}{2}$ to 1 per cent. solution of nitrate of silver in water, covered with Billroth's cambrie and secured by a bandage. These have alike the disadvantage that both the resorcin and silver lotion are liable to stain and discolour the linen, while the bandage slips readily off. To remedy these evils it has occurred to him to employ the resorcin solution otherwise than as a stupe. He remembered that an irritable skin, which will not bear washing with cold water, can have hot applied without harm. Therefore in place of enveloping in stupes he bathes the weeping area with a 1 per cent. hot solution of resorcin in water. The result of this was satisfactory, especially where the inflammation was severe. The improvement under this was rapid, and the itching soon abated. As to the frequency with which the lotion should be used, in cases where weeping is copious, it is enough to repeat it three times daily, when less, once or twice is sufficient. The resorcin lotion must be employed as hot as the patient can bear it without scalding. It should be heated in a porcelain vessel. The patient dips a ball of linen in the hot liquid and sops with this the diseased part. The dipping must be frequently repeated so as to maintain the application warm enough. Five to ten minutes are devoted to this. The surface is then allowed to dry, some absorbent cotton-wool put over it, and a transparent bandage wound on, so as to permit access of air and evaporation. In course of two or three days the oozing has ceased and the surface is dry. Then it is smeared over with Unna's paste—R *Zinci oxydi*, 10·0; *terre siliciæ*, 2·0; *adipis*, 28·0. He does not use Lassar's paste, as the contained starch is apt not to suit. Nor does he employ powders. This treatment is valuable in impetiginous eczema, as on the hands, and dries up the pustules. When cure is effected it is advantageous for a time to put on Unna's sulphur paste—R *Zinci oxydi*, 6·0; *sulphuris ppt.*, 4·0; *terre siliciæ*, 2·0; *adipis*, 28·0. He regards this plan of using a hot resorcin lotion as a distinct advance in the treatment of acute weeping eczema. Some illustrative cases are appended.

SUPERFICIAL ROUGH AREAS ON THE SURFACE OF THE SKIN.

Kromayer (*Deutsch. med. Woch.*, 4th September 1913) remarks that some persons, chiefly ladies, use cosmetic applications to the face to procure a fine skin and a delicate colour. Such are not infrequently eventually harmful. They render the skin tender. The epidermis, and in particular the horny layer, becomes thin and weak. The surface shows rough or abraded areas, which may end in eczema. In this rough part two components are defective, water and oil, which therefore have to be added artificially. The horny cells take up the water which renders

them soft, while the oil covers them and prevents evaporation. The most appropriate time for this innunction of the skin is directly after the act of washing with soap, when the sound and much more the defective horny layer swells and absorbs. Before the water again evaporates into the air and the aridity of the skin reasserts itself the integument must be freely anointed, and any excess subsequently removed by cotton-wool. Kromayer recommends that a cold cream be employed in this procedure rather than a simple oil. He gives several formulæ, but the one he prefers has the following composition:—

R Lanolini.
Eucerini, āā 20·0.
Aq. distillatæ, 40·0-80·0.
Paraffini liquidi.
Glycerini optimi, āā 10·0-20·0. M.

The addition of the glycerine is most valuable, and lends to the fatty emulsion a pleasant emollient property. Similar dry spots on the skin occur in those persons who, as medical men for instance, have to wash the hands frequently. The cold cream as above should be applied at once, after drying the hands, when the operation is done. Thus much trouble and annoyance will be obviated.

ULSARIN, A PROMISING REMEDY IN LUPUS.

Leonhard (*Wien. med. Woch.*, 27th June 1914) states that it has been found possible to combine our two best antiseptics, iodine and oxygen, in a stable form as a powder, called "ulsarin." This, discovered by Dr. Rudolf Mandl, is a non-poisonous bright yellow powder, hygroscopic, and when placed on the open palm it immediately becomes brown and emits a strong odour of iodine. It splits up, if in contact with any moisture, into iodine and nascent oxygen. It is made by Engel in Buda-Pest. Leonhard has tried this powder in a very obstinate case of lupus vulgaris. The patient, a woman of 29, had suffered from lupus of the right cheek and latterly of the nose for sixteen years. She had been treated by most of the accredited methods—scraping, the Finsen light, pyrogallie acid, cauterisation, etc.—with temporary improvement but constant recurrences. She was somewhat ill-nourished and pale. The lupus consisted of nodules, patches, and ulcerations. He treated the spots and ulcers by applying the powder daily. The parts to which it was applied assumed a dusky brown. The disease disappeared in shreds, as if wiped away. After two months the further use of the ulsarin was abandoned, but a few remaining miliary nodules were destroyed with the galvano-cautery. Two injections of old tuberculin gave no reaction, and to appearance the patient seemed cured. The treatment was begun in August and it was then October. The remedy appears worth further trial.

W. A. J.

LARYNGOLOGY, OTOTOLOGY, AND RHINOLOGY.

UNDER THE CHARGE OF

A. LOGAN TURNER, F.R.C.S., J. S. FRASER, F.R.C.S., AND
W. G. PORTER, F.R.C.S.TREATMENT OF LUPUS OF THE MUCOUS MEMBRANE BY NASCENT
IODINE SET FREE ELECTROLYTICALLY AFTER THE INTERNAL
ADMINISTRATION OF SODIUM IODIDE.

WE have already given an account in a previous number of the *Journal* of the employment of nascent iodine in the treatment of lupus of the nasal membrane. The iodine, administered internally in the form of sodium iodine, was liberated by means of oxygen supplied by packing the nasal cavities with strips of gauze which were kept constantly soaked by the instillation of hydrogen peroxide. In cases in which the disease was limited the treatment appeared to be on the whole satisfactory. When the disease involved the soft palate and larynx, spraying with hydrogen peroxide and inhalations of oxygen were used, but the difficulty in applying the oxygen for a sufficiently long period prevented the success of the treatment.

An attempt has been made to overcome this difficulty by setting free the iodine by means of electrolysis, and good results are said to have been obtained in the following way (*Arch. of the Roentgen Rays*, May 1914):—Sodium iodide is administered in a large dose—in the adult from 3 to 5 grammes being given. As the maximum effect of the electrolysis is said to be obtained from one to two hours after the drug has been swallowed, the needles are inserted into the affected tissues after that interval of time. A series of finely-pointed platinum-iridium needles are mounted upon a well-insulated metal handle, which is attached to the positive pole at which the reaction takes place. The negative pole may be held in the patient's hand. A constant current of 3 to 5 milliamperes is employed. The mucous membrane which is selected for treatment is anaesthetised with cocaine. The needles are then inserted into the diseased tissue and the current is slowly induced until 5 milliamperes are utilised. After a period of three minutes, the needles are removed and are again inserted into a neighbouring area of disease. The process may be repeated several times at the one séance. The treatment should be applied daily at first over a period of ten days, and subsequently at intervals of ten days, and then once per month until the disease is regarded as cured. If the operation is being satisfactorily carried out, a local reaction of the nature of swelling and superficial sloughing is observed. If there is no reaction the method is faulty.

DIATHERMY IN INOPERABLE CONDITIONS OF THE NOSE AND THROAT.

Harmer speaks favourably of the use of diathermy in malignant disease

of the nose and throat where the extent of the growth forbids ordinary surgical interference (*Journ. of Laryngol.*, London., October 1914). It seems to be most valuable for the destruction of large ulcerated areas when associated with dyspnoea, severe dysphagia, bleeding, and constant expectoration. The obvious advantages over the knife are the rapidity and ease of the operation, the possibility of removing the growth without loss of blood, the fact that the blood-vessels and lymphatics are sealed by burning, and the rapid recovery from the operation. There is no difficulty in destroying the superficial parts of the disease, and the patient is more comfortable afterwards. Sepsis is not nearly so common after this procedure as after cutting operations in the same locality. No shock is produced, and the patients are rarely confined to their beds for more than forty-eight hours. Very little inflammation of the surrounding parts follows, and in only two cases did he notice swelling of the neck. As far as possible the necrosed tissues were removed at the time of the operation, and the resulting sloughs separated in five to ten days, leaving a healthy wound covered with normal mucosa, without any tendency to scarring. The unfavourable cases were those in which the growth had invaded the neck, or in which the bone was diseased; in the latter diathermy caused periostitis, the ulceration persisted, and pain was thereby increased.

The apparatus which is adaptable to any voltage has two electrodes, each producing a high frequency current of great power. The larger electrode, wrapped in wet towels, is laid upon the patient's chest, while the smaller one is applied to the growth. Intense heat is produced in the smaller electrode and the tissues are rapidly destroyed, while the larger electrode, in which very little heat is produced, is kept cool with wet cloths. For the larger growths a general anæsthetic is required. When the superficial parts of the growth are destroyed, the burnt portions are removed with a sharp spoon, and then the deeper parts are attacked.

Nearly all the patients suffering from cancer were enormously improved by the treatment. The best result was obtained in an old man with carcinoma of the tonsil and tongue. After five applications of the cauterium he lived for two years with little discomfort until the last three months of his life. As regards the duration of life, Harmer observed amongst his patients treated in this way that three were alive and well two to nine months after their first treatment. Of the remaining fourteen, one lived for two years, one fifteen months, two for eight months, three for five, and one for four months. Two died within three weeks and three could not be traced. When considering these results, it must be borne in mind that all were cases of very advanced disease, and although life may not have been greatly prolonged, most of them received material benefit from the treatment.

ON THE USE OF NORMAL HORSE SERUM TO CONTROL HÆMORRHAGE
IN OPERATIONS UPON THE NOSE AND THROAT.

With the development of more radical operations upon the nasal cavities and tonsils, the question of hæmorrhage has become of greater importance. This is especially true in connection with the extensive removal of cartilage and bone from the nasal septum, the removal of the ethmoid labyrinth, and the complete enucleation of the faucial tonsils, which has so largely displaced the older method of tonsillotomy. Experience has taught us that troublesome hæmorrhage may be avoided on the one hand by a more careful preliminary examination of the patient, and on the other hand by a greater discretion in his immediate after-treatment.

The advent of serology and the study of chemical and biological changes in the blood have opened a line of research which will prove valuable in the preparation of patients, before operation, in whom a possibility of hæmorrhage may be suspected. While there are various local and constitutional causes of hæmorrhage, those that specially concern us in nose and throat work are hæmorrhages due to diminished or delayed blood coagulation, increase in blood-pressure, and the various hæmorrhagic diatheses.

Some interesting observations have been made by Goldstein (*Trans. Amer. Laryngol., Rhinol., and Otol. Soc.*, 1913) upon blood-pressure and blood coagulation in a number of patients who, prior to operation, received injections of normal horse serum. He found that there was a definite and consistently constant reduction of the coagulation time of the blood observed in his series of fifty cases, irrespective of age, constitutional dyscrasia, blood-pressure, or hæmoglobin percentage after the injection of the horse serum. The reduction varied from one half minute to three minutes in the experimental tests which were made, but it is pointed out that there is a still further reduction in the coagulation time when the blood is allowed to coagulate under normal conditions. This fact was observed by watching the blood-drop left on the lobe of the ear, and comparing its coagulation time with that of the blood in the experimental test apparatus. Of the fifty cases operated upon, five had general anæsthesia, forty had local anæsthesia, 5 or 10 per cent. of cocaine brushed on the parts, while five had no anæsthesia of any kind. In no case was adrenalin employed, nor was any infiltration anæsthesia used. In no case was there active bleeding of any kind after the patient left the operating table. There was no secondary hæmorrhage. In the tonsillectomies he did not observe any of the surface oozing which he had previously noticed in patients not injected with horse serum. Hæmorrhage was much reduced in the cases of septal resection, and there was no troublesome oozing or slow bleeding, such as he had formerly observed. While emphasising the efficacy of fresh, normal, sterile horse serum, as reducing the coagulation

time of the blood, Goldstein points out the necessity of using fresh serum, as its potency undoubtedly deteriorates after a certain period. The preparations which he used were never more than three months old. The serum was prepared for use in capsules containing 10 cm., and was injected from twelve to twenty-four hours before the operation. Whenever the coagulation time of the blood was found experimentally to exceed seven minutes, the serum was injected before the operation. He deprecates its use as a final measure in cases of hæmorrhage when all other methods have failed to check the bleeding.

In several cases of hæmophilia three or four successive injections were given at intervals of twelve to twenty-four hours, and were continued until a reduction in the coagulation time of the blood was observed, and then operation was carried out. In two cases a latent rash or urticaria was observed. In a child the rash appeared six days after the injection and lasted for about thirty-six hours, and in an adult a roseolar eruption appeared on the second day after the use of the serum.

A. L. T.

NEW BOOKS.

Nature and Nurture in Mental Development. By F. W. MOTT, M.D., F.R.S. Pp. 150. With 23 Illustrations. London: John Murray. 1914. Price 3s. 6d. net.

DR. MOTT has expanded his Chadwick lectures of 1913 into a small volume, which may be cordially recommended to anyone who desires a very condensed summary of current medical, biological, and psychological teaching as to the respective *rôles* of heredity and environment in mental development. The correlation of structure and function in the brain is made clear by well-chosen illustrations, and numerous pedigree charts display the influence of heredity on physiological, mental, and moral qualities. Altogether the book seems well fitted to fulfil the author's desire that it may "stimulate the reader to further inquiries." It is only just to add that the reader's pleasure is somewhat marred by not a few mistakes in grammar and curious intricacies of style. In more than one involved sentence Dr. Mott succeeds in saying something which he cannot possibly mean, though what he probably does mean might have been expressed quite simply. We have not noticed many errors of statement, but our suspicion that Galton (p. 50) and Routh (p. 89) had not been quite correctly quoted proved, on consulting the originals, to be well founded.

Bed-side Hematology. By GORDON R. WARD, M.D. Pp. 394. Philadelphia and London: W. B. Saunders Co. 1914. Price 15s. net.

WE are informed that this volume is primarily concerned with that

clinical study of the so-called blood diseases which has been so much overshadowed by exclusively pathological investigation. It is secondly concerned with classification.

The author has evidently carried out his first intention by insisting dogmatically on those views of pathology which he favours, and his second by giving a classification which is peculiarly his own. In regard to pernicious anemia, he has adopted (without acknowledgment) the views of Dr. William Hunter; but whereas Hunter admits that his opponents have at least a case to answer, the author dismisses their arguments with a sneer at their alleged Teutonic origin. We are told that the salient point about chlorosis is the *fact* that the plasma is greatly increased. Would clinical study have been unduly overshadowed or courtesy overstrained if the reader had been told that this *fact* is a theory based on pathological investigation by Professor Lorrain Smith?

The only direction given for calculating a blood-count is a short-cut method which appears in a well-known treatise, but there is no explanation of how the method is arrived at. A drawing made from films stained in six different ways and from six different cases cannot at any time have much value. Surely the case or the method should be a constant. This, like most of the illustrations, is a poor line diagram, but there are some good reproductions of photographs of cases. The book seems to us to offer but slight practical help to the beginner. As a guide to modern hæmatology it is narrow and unfair. As an exposition of the views Dr. Ward has adopted it is doubtless excellent.

Dietetics: or Food in Health and Disease. By WILLIAM TIBBLES, LL.D., M.D., Chicago. Pp. 627. London: Baillière, Tindall & Cox. 1914. Price 12s. 6d. net.

DR. TIBBLES is already known as the author of *Foods: their Origin, Composition, and Manufacture*. He publishes the present as a supplement to the former volume, as containing the practical application to medicine of a knowledge of foods.

The first part of the book deals with what may be termed physiological dietetics, giving a succinct account of the caloric values of foods, their digestibility, absorbability, of the old unsettled questions of the daily standard dietary, the optimum protein fraction, and of the various special dietaries, such as vegetarianism, fruitarianism, etc.

The second half of the book deals with food in disease. This part, like the former, follows the well-trodden paths, and under each of a considerable list of diseases gives the approved diet or diets. The book concludes with a useful account of the investigations into beri-beri, scurvy, etc., and into the chemical nature of the so-called vitamins.

It will be seen from this short survey that the author has not departed from the conventional text-book treatment of the subject of dietetics. The time indeed has not yet come when such a departure is possible, for in spite of much laborious investigation, the employment of food, whether in health or disease, remains largely an empirical and experimental matter, and dietetics is still far removed from the status of an exact science. But until that advance is made, Dr. Tibbles' book will take a worthy place with others on the same subject. It is written by an expert, and is a clear, accurate, and not too voluminous guide to an important and intricate subject.

The Salvarsan Treatment of Syphilis in Private Practice. By GEORGE STOPFORD-TAYLOR, M.D., M.R.C.S., and ROBERT WILLIAM MACKENNA, M.A., M.D., B.Ch. Pp. 90. With Illustrations. London: William Heinemann. 1914. Price 5s. net.

IN reading this book one is at once impressed with the fact that the authors are writing out of a full experience. The details are given clearly and concisely, which makes it pleasant reading—all the more convincing because of the good photographs. The first chapter deals with the methods of isolating and staining the spirochætæ, the second with parasyphilis, while the last two are concerned with treatment purely.

Neo-salvarsan is so much easier to use and so much more frequently employed nowadays that it is a pity it is not mentioned. The limitations of results and the necessity of combined treatment with mercury are rightly insisted on.

I. K. Therapy: With Special Reference to Tuberculosis. By W. E. M. ARMSTRONG, M.A., M.D. Pp. viii. + 83. London: H. K. Lewis. 1914. Price 5s.

IN this small volume the author sets out to give an exposition of the treatment of tuberculosis by Carl Spengler's I. K.

There is evidence that much care has been taken in the preparation of the volume. While the author states that he has seen very good results from I. K. treatment, he leaves the verdict of its utility to others—a wise proceeding, which might be extended with much benefit.

I. K. is a solution of the whole blood of an immune animal, as the writer states that by far the greater portion of antibodies are found in the erythrocytes. The blood is diluted to begin with 10,000 with weak antiseptic solution, so that the blood molecules become "ionised." From this standard solution, further dilutions are made when a case is being treated. Such weak solutions as one hundred-thousand-million-fold dilution are used, and these latter solutions are said to show more

the antitoxic effect of I. K., whereas stronger solutions show more of the lytic effect.

The clinical evidence furnished by the writer is disappointing.

The book is well written, and is, we think, essential for any who care to try treatment by I. K.

Pain: Its Origin, Conduction, Perception, and Diagnostic Significance.

By RICHARD J. BEHAN, M.D., Dr. Med.(Berlin). Pp. xxviii.

+ 920. With 191 Illustrations. New York and London:

D. Appleton & Co. 1914. Price 25s. net.

THIS is a somewhat bulky German-American compilation, in which the views of hundreds of different authorities are quoted—not a few of them at variance with one another. The different parts of the body, with the different types of pain to which they are susceptible, are here considered *seriatim*. Every practising physician or surgeon, of course, knows how unreliable all such data in regard to the sensations are; particularly are pain sensations liable to be modified at every turn by psychical states. In practice, then, psychology holds a premier position in all questions relating to pain, but in the present work the psychological aspect is only touched on incidentally; the limitations of the work from a practical aspect will therefore be understood, though it should be distinctly useful for purposes of reference. In passing we might remark that the practice here exemplified, and not uncommon in books of this type, of introducing photographs of nude and prepossessing females into the text, is not without its drawbacks; these illustrations are apt to distract the minds of at any rate the younger and more susceptible medical readers from due consideration of the subject under discussion. We would suggest that the purpose ostensibly promoted by the exhibition of these seductive daughters of Eve would be perhaps even more effectively carried out by a multiplication of the figures of bald-headed and entirely diagrammatic males, of which several appear in the pages under review.

Know Your Own Mind. By WILLIAM GLOVER. Pp. vii. + 204. Cambridge: At the University Press. 1914. Price 2s. net.

THIS little book is essentially the work of a man with ideas of his own. The author, who has apparently had much practical experience as the headmaster of an English public school, is an adherent of the Herbartian psychology, but treats his subject in a highly individual manner. He deals with the different aspects of the mind's machinery, devoting particular attention to the central problem of mental assimilation, known in Herbartian phraseology as "apperception."

As the official pedagogues of the present day seem to be becoming less and less capable of carrying out the primary purpose of their art—namely, to teach people how to live—it is constantly falling to the

doctor to institute a belated "re-education" among the victims of this colossal myopia of our established educational system. To the wise physicians who recognise the need of buckling to and becoming school-masters we warmly commend this volume. Its author is not only a man of practical experience; he possesses that chief of all human virtues, a sense of humour.

A Handbook for the Post-Mortem Room. By ALEXANDER G. GIBSON, D.M., F.R.C.P. Pp. 140. 13 Illustrations. London: Henry Frowde and Hodder & Stoughton. 1914. Price 3s. 6d. net.

THIS is a useful little book intended primarily for students but adapted also for practitioners and specialists. It treats of the apparatus and instruments required by the pathologist, and the method of removal and examination of various organs. There is a short chapter upon "special post-mortems," including bacteriological work, medico-legal cases, etc., and one upon the restoration of the body and the preservation of organs. The method of carrying out the sectio which the author advocates is excellent, although open to criticism in one or two small points. For example, the heart is detached from the thoracic viscera before the aorta is investigated or opened up. This would, in most cases, be a perfectly safe procedure, but in certain instances—thrombosis in the ascending aorta, small aneurysms, etc.—valuable specimens would be damaged. The kidneys and suprarenals are removed before the stomach, duodenum, and liver. One would have thought it better to remove the stomach and liver first. Some space is devoted to methods of fixing the calvarium in place after the removal of the brain in order that no ridge may be visible on the forehead. All this is unnecessary if two saw cuts meeting at an obtuse angle be employed in removing the calvarium instead of the circular saw cut.

These slight defects do not, however, detract from the general usefulness of the book. Moreover, the photographs of the instruments and the diagrams illustrating the methods of opening up the heart and of investigating the central nervous system are admirable.

Acute General Miliary Tuberculosis. By Professor Dr. G. CORNET. Translated by Mr. F. S. TINKER. Pp. vi.+107. London: John Bale, Sons & Danielsson, Ltd. 1914. Price 6s. net.

PROFESSOR CORNET gives an excellent summary of our present knowledge of acute general miliary tuberculosis in this small work, the translation of which has been carefully done by Mr. Tinker. The author discusses in a concise but thorough manner the etiology, pathological anatomy, symptoms, course, and diagnosis of the disease. He considers that the breaking down of vascular tubercles, which may be found in the walls of the large vessels fulfils all the conditions necessary for the origin of miliary tuberculosis. He also points out that the clinical

conception of miliary tuberculosis is a much wider one than the anatomical. A useful bibliography completes the work. It may be cordially recommended to all interested in the subject of tuberculosis.

Chronic Colitis: Its Causation, Diagnosis, and Treatment. By GEORGE HERSHELL, M.D., and ADOLPHE ABRAHAM, M.D. Pp. 273. London: Longmans, Green & Co. 1914. Price 6s. net.

COLITIS belongs to a group of diseases which, although by no means new, has, like appendicitis and duodenal ulcer, attained within recent years a much greater frequency and notoriety. In the absence of any manual on the subject the publication of this handy and attractive volume is as opportune as it is welcome. The pathology and symptomatology of the affection are dealt with on orthodox lines and are followed by a chapter on diagnosis, which includes an excellent account of the examination of the patient, the use of the sigmoidoscope, and of diagnostic lavage of the colon and the examination of the stools: this latter is gone into with thoroughness and, being eminently practical, is well worth the careful consideration of the practitioner. The larger half of the volume is concerned with treatment.

Local Anæsthesia. By DR. ARTHUR SCHLESINGER, Berlin. Translated by F. S. ARNOLD, B.A., M.B., B.Ch. Pp. viii. + 208. Illustrated. London: William Heinemann. 1914. Price 5s. net.

DR. SCHLESINGER'S little book will be welcomed by many, because it gives a good account of local anæsthesia by one who is an adept in its use and who recognises the limitations as well as the advantages of a method which has gained much in popularity within recent years. In the earlier chapters an admirable account is given of the general principles underlying the application of local anæsthesia, of the drugs used, of infiltration, conduction, and venous anæsthesia, and of the general technique to be used, while the later chapters deal with particular operations on the various regions of the body, including the eye, ear, and nose. The book as a whole may be commended to those seeking a good practical guide to the use of local anæsthesia. The translator has done his work well and the descriptions are clear and easily followed. The addition of some illustrations in the latter half might perhaps help the reader to follow the various applications of conduction anæsthesia more readily, and future editions should include descriptions of the methods recently elaborated for anæsthetising the brachial plexus and the Gasserian ganglion and its main branches. Apart from these omissions, which are not of serious importance, inasmuch as they deal with methods of limited application, Dr. Schlesinger's book gives a very complete description of local anæsthesia, and should prove of value both to practitioners and surgeons.

Diagnostic Symptoms in Nervous Diseases. By EDWARD LIVINGSTONE HUNT, M.D., New York. Pp. 229. Illustrated. Philadelphia and London: W. B. Saunders Co. 1914. Price 6s. 6d. net.

THIS little work gives the salient points and leading symptoms of the principal nervous diseases in tabular form, and will be found most useful to practitioners and house physicians, when studying nervous cases, who wish to be saved the "laborious search involved in consulting the larger text-books." Symptoms are described and tables given of the various diseases in which they occur. For example, Babinski's reflex is shown to occur in twelve diseases, optic neuritis in thirteen different conditions, convulsions are arranged into six classes, and each head in the classification is described; paralyses, tremors, and gaits are also treated in the same way. The chapter on aphasia is one of the best, and the author's method of examining an aphasic is excellent. The illustrations are nearly all original and are well executed, the book is nicely got up, and there is a good index.

Spectrum Analysis Applied to Biology and Medicine. By the late C. A. MACMUNN, M.A., M.D. Pp. xiv. + 112. With 22 Illustrations. London: Longmans, Green & Co. 1914. Price 5s. net.

WE find in this book a succinct but clear summary of the author's final views on the relationships of the various biological pigments, whose investigation occupied the scant leisure of a strenuous professional life. His death occurred before the work had passed through the press, and it is evident that the book has suffered in certain of its details from this cause, though the willing help of friends has made its publication possible. The subjects which are covered are the general chromatology of plants and animals, the derivatives and inter-relations of chlorophyll, hæmoglobin, the histohæmatins, biliary and urinary pigments, and certain pigments found in the invertebrates. Whether we agree with all the author's views or not, we cannot but feel that the questions raised are dealt with by one who possessed an eminently scientific mind, and who studied the subject long and thoroughly.

The chapters dealing with the physical apparatus employed are much less satisfactory, and might with advantage be omitted from any future edition. In particular that one which deals with spectrophotometry is quite inadequate, and if retained should be entirely re-written, for in its present state it would prove incomprehensible to those who are not already well informed on the subject.

The book closes with an excellent bibliography, which much enhances its value.

FOREIGN BOOKS.

Die Gonorrhoe des Weibes. By Professor Dr. F. FROMME. Pp. 56.
Berlin: S. Karger. 1914. Price Mk. 2.

IN this book will be found a very concise and authoritative treatise on the pathology, the symptomatology, and the principles governing the treatment of gonorrhœa as it affects the female. The views expressed bear the authority attaching to all the writings of one whose experience in this class of case is unrivalled. To all who are specially interested in gynæcology this book will be welcome.

Die Moderne Therapie der Gonorrhoe beim Manne. By Professor Dr. PAUL ASCH. Pp. 84. With 25 Illustrations. Bonn: A. Marcus & E. Weber. 1914. Price Mk. 2.60.

THIS little book, consisting of twelve lectures on the treatment of gonorrhœa and its complications in the male, is a very complete and practical treatise on the subject. The last four lectures on the use of the various forms of urethroscope and other special instruments for the treatment of intractable cases of urethritis will be of interest chiefly to the specialist, but form a very clear and precise exposition of the scientific treatment of a frequently neglected type of case. The arrangement of the book is excellent, and lends itself to rapid and easy reference regarding individual points.

Bakteriologische Untersuchungen der Genitalsekrete der nichtschwangeren und nichtpuerperalen Frau vom Kindes- bis ins Greisenalter unter physiologischen und gynäkologisch-pathologischen Verhältnissen.
By Dr. MAUNU AF HEURLIN. Pp. iv. + 226. With 4 Plates and 15 Tables. Berlin: S. Karger. 1914. Price Mk. 12.

THIS monograph, which is based on a large series of investigations, is one of great importance to obstetrical and gynecological science. The author finds that from the earliest weeks of infancy the vaginal and vulvar secretion is alkaline. About puberty it becomes acid, and remains so in healthy women during the child-bearing period, to become alkaline again in very old women. The cervical secretion remains alkaline always. The most striking results have been obtained by a carefully planned investigation of the bacteriological content of the vagina and vulva at all ages. The author believes that the majority of the germs normally present in these regions are derived from the bowel, some being derived from the skin. The bacterial flora can be divided into four types. In early years the organisms of intestinal origin can thrive, but after puberty the secretion acquires the faculty of destroying these in healthy women, and in them the chief organism consists of the vagina bacillus. In the genital canal of healthy women the only pathogenic germ that can live is the gonococcus. The nature

of this germicidal power is discussed. The author does not believe it to be due to the opposing influence exerted by the saprophytes normally present. The book is full of interest and suggestion, especially at a time when the flora of the genital tract are being studied so largely in relation to self-infection after labour, etc.

Bakteriologische Untersuchungen des Keimgehaltes im Genitaltrakte der fiebernden Wöchnerinnen mit Berücksichtigung der Gesamtmorbidity im Laufe eines Jahres. By Dr. MAURIC F. HEURLIN. Pp. vii. + 618. With 3 Plates. Berlin: S. Karger. 1914. Price Mk. 12.

THIS volume is a record of elaborate researches carried out at the University clinic of Helsingfors. The number of cases investigated was 2152. The total morbidity was 11.33 per cent. and the mortality 0.093 per cent. The morbidity was much commoner in primiparae than in multiparae (15.52 per cent. to 8.6 per cent.). Interesting figures are given showing the seasonal incidence of puerperal troubles. The highest figures are in November, December, and April. The extra-genital conditions (pneumonia, bronchitis, etc.) show a graded increase from September to April, whilst in July and August the causes of the fever are almost entirely located in the genital canal itself.

Important facts are given regarding the organisms present in puerperal infection. Where facultative anaerobic cocci were the cause of the fever, the author found that they were chiefly streptococci. In his whole series he found only one case of endometritis due to staphylococcus pyogenes aureus. He found pneumococcus in the uterine cavity once, the infection being a complication of pneumonia. *Bacterium coli* was never present alone in the uterine cavity. It was only found once in quantity in combination with streptococcus pyogenes and anaerobic bacteria. In three other cases of one-day fever it was found in small quantity in association with anaerobic bacteria. Gonococcus was only found as a cause of fever in 4.1 per cent. of the affected cases. Other organisms rarely found were micrococcus tetragenus, *B. perfringens*, *M. foetidus*, and *B. ramosus*.

The clinical aspects of puerperal infection are worked out in their bacteriological relations. The monograph, though overloaded with detail, is one that may profitably be consulted by obstetricians and gynecologists.

Leitfaden der Säuglingskrankheiten. Von Dr. WALTER BIRK. Pp. viii. + 256. Bonn: A. Marcus & E. Weber. 1914. Price Mk. 4.80.

THIS is an extremely good and practical little book, and we can thoroughly recommend it. A great part of it, as is natural, is con-

cerned with the disorders of nutrition, and in regard to these the teaching of Czerny and Finkelstein is adopted. Written as it is from the German point of view, it will be most appreciated here by those who have some special knowledge of the diseases of infancy, and they will not fail to be interested in noticing how often in it the differences of opinion, both as to the nature of the diseases and the methods of treatment from those held here, depend in reality on differences in the class of cases seen in the two countries. For this reason it is less suited for the beginner than for the advanced student in this country, although we are sure it will be popular in Germany among all classes of practitioners.

Dr. Jessner's Dermatologische Vorträge für Praktiker. Heft 1—Des Haarschwunds Ursachen und Behandlung. Von Sanitätsrat Dr. S. JESSNER. Siebente verbesserte Auflage. Würzburg: Curt Kabitzsch. 1914. Price Pf. 90.

Loss of hair is regarded by both sexes, though perhaps scarcely in an equal degree, as a calamity, and to postpone or prevent its onset has ever been the aim of medical art. The volume before us is based on conservative lines, and will be found a reliable guide, stored with sound advice. While the well-tried remedies are fully described, the value of the mercury vapour lamp is highly extolled. In particular, the form known as artificial sunlight is regarded as eminently practical, and full instructions as to how it should be applied are provided. This seems most valuable in alopecia areata and in the seborrhoeic type of baldness.

Physiologie normale et pathologique des reins. By L. AMBARD. Pp. 332. With 22 Illustrations. Paris: Gittler. 1914. Price 15 francs.

THIS book is the direct outcome of a course which the writer has given for several years at the Hospital Neckar upon the physiology of the kidney. It forms largely a record of experimental work carried out partly upon animals, partly upon patients, and is of a thoroughly practical nature. The writer follows Widal in classifying nephritis, from the purely functional point of view, into those cases with defective chloride excretion, those having imperfect nitrogenous elimination, and mixed types. He therefore treats the subject with regard to the functioning power of the kidney and the various tests to estimate this, practically ignoring the histological standpoint. The book forms an admirable practical résumé of the teaching of the modern Paris school as to defects of the kidney.

Ueber Brüche des knöchernen Trommelfellrandes. Von Professor Dr. HEINRICH WALB in Bonn. Pp. 67. Bonn: A. Marcus & E. Weber. 1914. Price Mk. 3.

THE author has been working at this subject for many years, basing his observations on over a hundred cases of injury to the skull. He

supports von Bergmann's contention that bleeding from the auditory meatus is very far from being a reliable sign of fracture of the base, and has himself found that the bleeding in the majority of cases proceeds from an isolated fracture of the *margo tympanicus* associated with rupture of the *membrana tympani*. These peripheral fractures of the petrous temporal are often combined with injury to the labyrinth, which in its turn is responsible for the long-continued deafness, headache, and giddiness which follow upon injuries of the skull. Professor Walb's observations are of great practical importance and merit the attention of surgeons and of aurists in this country.

NEW EDITIONS.

Infant Feeding. By CLIFFORD G. GRULEE. Second Edition. Pp. 314. Philadelphia and London: W. B. Saunders Co. 1914. Price 13s. net.

IN this work the author succeeds in placing his views regarding infant feeding before the reader in an attractive manner. He gives prominence to the theories and teaching of Czerny, Keller, and Finkelstein, and lays much stress on the tolerance curves as drawn by von Pirquet.

The book is illustrated by eight coloured plates representing types of infant stools, and also by several photographs.

The Pocket Formulary for the Treatment of Disease in Children. By LUDWIG FREYBERGER, J.P., M.D., M.R.C.P., M.R.C.S. Fourth Edition. Pp. 260. London: William Heinemann. 1914. Price 7s. 6d. net.

THE fourth edition of this book has been somewhat enlarged, and it certainly now gives in a very concise form much information regarding the treatment of diseases of children by drugs. One excellent point in an excellent book is that those drugs of which the author has had personal experience are, in the paragraph devoted to their therapeutics, spoken of as "very useful" or "useful." Other drugs of which he has not had the same experience are simply "recommended."

The book should be very popular with the busy practitioner and the senior medical student.

Public Health Laboratory Work. By HENRY K. KENWOOD, M.B., D.P.H. Sixth Edition. Pp. xii. + 418. London: H. K. Lewis. 1914. Price 10s. net.

WE are not surprised that a new edition of this well-known laboratory guide has been called for. For long Dr. Kenwood's manual has been the standard work in all public health laboratories, and year after year students have gone through the methods of analysis so clearly and

definitely detailed in this volume, and the test of practical examination has proved in most cases that they have not studied in vain. We think that the author has done wisely in excluding the subject of bacteriology. This separation has allowed Dr. Kenwood to give his sole attention to the analysis of foods, etc. The methods are so clearly described that almost anyone, even with the minimum knowledge of chemistry, will be able to perform the analysis with comparative exactitude. The chapter which deals with the addition of antiseptics and colouring matter to foods is perhaps the best description of this subject that we know of anywhere.

BOOKS RECEIVED.

- BAINBRIDGE, F. A., and J. A. MENZIES. *Essentials of Physiology* (*Longmans, Green & Co.*) 10s. 6d.
 BARNES, H. A. *The Tonsils* (*Henry Kimpton*) 12s. 6d.
 BINET, A., and TH. SIMON. *Mentally Defective Children* (*Edmond Arnold*) 2s. 6d.
 BRAUN, H. *Local Anaesthetic: Its Scientific Basis and Practical Use* (*Henry Kimpton*) 21s.
 BROWN, W. L. *Physiological Principles in Treatment*. Third Edition (*Bailliere, Tindall & Cox*) 7s.
 CALENDAR of the School of Medicine of the Royal College, 1914-15 —
 CALOT, F. *Indispensable Orthopaedics* (*Bailliere, Tindall & Cox*) 21s.
 CATECHISM Series. Part I., Botany. Part II., Medicine (*E. & S. Livingstone*) 1s.
 CHAVASSE'S Advice to a Wife. Sixteenth Edition (*J. & A. Churchill*) 1s. 6d.
 FRIEL, A. R. *Obiter Scripta: Throat, Nose, and Ear* (*J. Wright & Sons*) 2s. 6d.
 GLASGOW District Mental Hospital, Gartloch, Seventeenth Annual Report for 1913-14 —
 GOULSTON, A. *Cane Sugar and Heart Disease* (*Bailliere, Tindall & Cox*) 5s.
 GULLAND, G. L., and A. GOODALL. *The Blood* (*W. Green & Son*) 15s.
 HARE, H. A. *A Text-Book of Practical Therapeutics*. Fifteenth Edition (*Henry Kimpton*) 21s.
 HAYES, R. *The Intensive Treatment of Syphilis and Locomotor Ataxia by Aachen Methods* (*Bailliere, Tindall & Cox*) 3s. 6d.
 JADROO. *Life: Its Origin and Energy Mechanism* (*Henry Kimpton*) 1s.
 JOSEPH, M. *A Short Handbook of Cosmetics* (*William Heinemann*) 2s. 6d.
 LEJARS, F., and W. S. DICKIE. *Urgent Surgery*. Vol. I. (*J. Wright & Sons*) 25s.
 LOEB, H. W. *Operative Surgery of the Nose, Throat, and Ear*. Vol. I. (*Henry Kimpton*) —
 MARSHALL, C. F. *Syphilology and Venereal Disease*. Third Edition (*Bailliere, Tindall & Cox*) 10s. 6d.
 OLIVER, SIR THOS. *Lead Poisoning* (*H. K. Lewis*) 5s.
 PAGET, S. *Pasteur and After Pasteur* (*A. & C. Black*) 3s. 6d.
 PATON, D. NOEL. *Essentials of Human Physiology*. Fourth Edition (*W. Green & Son*) 12s.
 PRITCHARD, E. *The Infant: Nutrition and Management* (*Edvard Arnold*) 3s. 6d.
 QUAIN'S Elements of Anatomy. Eleventh Edition. Vol. II., Part II., *Splanchnology*, by J. Symington (*Longmans, Green & Co.*) 10s. 6d.
 RUTIN, E. *Diseases of the Labyrinth* (*Edvard Arnold*) —
 SAVILL, T. D. *A System of Clinical Medicine*. Fourth Edition (*Edvard Arnold*) 25s.
 STATE Board of Health, New Jersey. *Thirty-seventh Report, 1913* —
 STEWART, G. N. *A Manual of Physiology*. Seventh Edition (*Bailliere, Tindall & Cox*) 18s.
 SUTHERLAND, G. A. *The Heart in Early Life* (*Edvard Arnold*) 6s.
 THE Clinics of Dr. John B. Murphy. Vol. III., No. 3 (*W. B. Saunders Co.*) —
 WRIGHT, SIR A. E. *On Pharmaco-Therapy and Preventive Inoculation* (*Longmans, Green & Co.*) 4s. 6d.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

"For Valour."

A SUPPLEMENT of the *London Gazette* issued on 16th November announced that "His Majesty the King has been graciously pleased to approve of the grant of the Victoria Cross to the undermentioned officers, non-commissioned officers and men for their conspicuous bravery whilst serving with the Expeditionary Force." The list comprises nine names, including one member of the medical profession, Captain HARRY SHERWOOD RANKEN, Royal Army Medical Corps, "For tending wounded in the trenches under rifle and shrapnel fire at Hautvesnes on 19th September, and on 20th September continuing to attend to wounded after his thigh and leg had been shattered." As announced in our last issue, Captain Ranken died of his wounds at Braisne on 25th September.

CASUALTIES.

KILLED in action on 21st October, Lieutenant DAVID WYLIE RINTOUL, M.B., Ch.B., R.A.M.C., aged 25.

Lieutenant Rintoul graduated at the University of St. Andrews in 1912. He obtained his Commission in the R.A.M.C. on 30th January 1914, having only recently finished his course of training and been confirmed in the army when the war broke out.

KILLED in action, Captain ANGUS MACNAB, M.B., Ch.B., F.R.C.S., R.A.M.C.(T.).

Captain MacNab graduated in the University of Edinburgh in 1901. He served in the South African War, and received the Queen's medal. He subsequently took the Fellowship of the Royal College of Surgeons of England and devoted himself to *Ophthalmic Surgery*. In the present war he served as Medical Officer to the London Scottish.

LOST with H.M.S. *Good Hope*, Surgeon FERNAND LOUIS I. M. DE VERTEUIL, R.N.R.

Surgeon de Verteuil graduated M.B., Ch.B. in the University of Edinburgh in 1908, and M.D. in 1909.

KILLED in action, Captain ERNEST MURE GLANVILLE, M.B., Ch.B., R.A.M.C.

Captain Glanville graduated in the University of Edinburgh in 1901. After holding various resident hospital appointments he entered the Royal Army Medical Corps in August 1903, and was promoted to Captain in February 1907.

KILLED in action, Lieutenant MARTIN JAMES RICHARDSON, M.B., Ch.B., R.A.M.C.

Lieutenant Richardson graduated in the University of Edinburgh in 1889.

THE ORACLE, 1914.*

The Kaiser in a fit of Blues,
 Caused by the none too cheerful news
 That crowded in from East and West,
 That hurt his pride, disturbed his rest—
 Sought counsel of a Sibyl old,
 Who could the scroll of Fate unfold.
 At least she so professed to do,
 Tho' only *Fools* believed it true.
This may perhaps excuse the Kaiser
 For thinking Sibyls could be wiser
 Than he, who ruled the German State
 And was with God so intimate.

In cavern dark where flows the Rhine
 This Sibyl kept her mystic shrine:
 Here see the mighty Kaiser stand,
 Holding the Crown Prince by the hand,
 And, tho' it seems beyond belief,
 Both trembling like the aspen leaf.
 Till Willie warming to his task
 Said, "Mother, I have come to ask
 If God will aid the arms of Prussia
 Or is He on the side of Russia?"

Back came the answer from the gloom,
 "'Tis written in the Book of Doom
 'God will help Prussia!'"

To Willie, spoiler of Louvain,
 The Sibyl's answer was quite plain.
 The Kaiser, not so easily fooled,
 Began to feel his leg being pulled.
 Yet still his faith in mystic lore
 Made him ask question number four.
 "Tell me," he said, "shall Britain's right
 Prevail against the Germans' might:
 Who shall be victor in this battle,
 The Kaiser or those *British Cattle*?"

Back came the answer like a shot,
 In language of the Land of Scot,
 "The Kye, sir!"

The cavern rang with shouts of joy,
 The Kaiser kissed his soldier boy.

Both thought a somewhat clearer answer
 Was due a Prussian Death's Head Lance.
 But as the Sibyl would not deign
 The answer further to explain,
 The Kaiser, never at a loss,
 Bestowed on her an Iron Cross.
 Then asked as humbly as he could
 (Thinking of *Austria* red with blood)
 "When terms of Peace are written down
 Who is to share the Victor's crown?"

Back came the answer from the gloom,
 "'Tis written in the Book of Doom
 'Franc(e)is!'"

Once more the meaning was not clear,
 But fools rush in where angels fear:
 Thus Wilhelm once again essayed
 To gather knowledge from the maid
 Who from the darkness of the cave
 Such mystic utterances gave.
 "Tell me, O Priestess, if you can,
 What is the future of Japan?
 Shall Willie here, my noble son,
 Accomplish what I have begun?
 I see him rule an Eastern Empire!
 I see him rising, rising higher!
 Tell me, O Sibyl, if you can,
 Shall he be victor or Japan?"

Back came the answer from the gloom,
 "'Tis written in the Book of Doom
 'The Rising Son!'"

W. F.

*The above *poem* recently appeared in the columns of the *Spectator*. We are indebted to our colleague the writer for permission to reproduce it here.

General Medical Council.

IN his presidential address at the opening of the Autumn sitting of the General Medical Council held on 25th November, Sir Donald MacAlister said that multitudes of medical men had nobly offered themselves for service with the troops at home and abroad, and many had already laid down their lives in the performance of their duty. The toll of war was not complete. They must face the certainty that ere long the ranks of the profession would be sadly depleted. Ample reserves were necessary to supply the places of those who fell on the field of honour. The need for efficient physicians and surgeons, in the field and at home, was not less urgent than the need for efficient soldiers and sailors. He had felt it his duty to press this consideration on senior students who, though they had nearly completed their curriculum, were ready to forego the prospects of early qualification and to enrol themselves straightway in the combatant forces. It was currently reported that owing to the war the number of the students of all years enrolled for the present *annus medicus* was much below the average. If this be true, the risk of a serious deficiency in the future supply of qualified practitioners would appear to be imminent. Sir Donald went on to read the reply of the Executive Committee to inquiries from several licensing bodies as to the propriety of modifying or suspending some of the existing regulations in the case of students whose regular course of study might be interrupted by military service. The reply emphasised the importance of maintaining a sufficient standard of professional knowledge and skill, and directed attention to the series of recommendations which represented in general terms the minimum curriculum which in the Council's opinion should be required.

We are glad to find that the opinions we expressed last month on the duties of senior medical students in the present crisis are in accordance with those of such a high authority as the President of the General Medical Council.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND THE ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—

At the quarterly examinations of the above Board, held in Edinburgh in October, the following candidates passed the *first examination*:—Marmond A. K. Mofreh; William B. Laysan; Archibald B. MacDougall; Ernest E. Bronstorph; and Hassan A. Madwar.

The following candidates passed the *second examination*:—Jackson B. Minford; Nicholas J. Landscher; Henry Morris; Robert Woods; Frank Jones; John L. West; Paul Vertannes; William U. D. Longford; Clifford Pullan; and George M. S. Lindsay.

The following candidates passed the *third examination*:—Elliot P. Dewar; Gulabrai T. Makhiani; Yeserunt N. Kadama; Charles E. Moryon; John R. B. Robb; William G. Bowie; Maurice A. White; and Alfred E. Elliott.

The following candidates having passed the *final examination*, were admitted L.R.C.P.E., L.R.C.S.E., L.R.F.P.S.G.—Allan Beresford Hawkins, British West Indies; Florence Winifred Hayworth, Liverpool; Norman Hamilton Brewster, British West Indies; William Henry O'Grady, Co. Mayo; John Ramsay Fleming, Airdrie; Gerald Christopher Stanley Pavia, Caylon; William Clarke Fraser, Dundee; Arthur Edwin James, Auckland, New Zealand; Leonard Owen Wehman, Colombo; Arthur Alexander Marison, Dumbarton; John Martin, Glasgow; Gwilym Lewislyn Pierce, Llangollen; William Smith O'Loughlin, Limerick; and Khusru Roostamji Mohta, Calcutta.

SOME OBSERVATIONS UPON PRIMARY NEW GROWTHS OF THE MEDIASTINUM FROM A STUDY OF SIXTY CASES.*

By J. N. MACBEAN ROSS, M.D.(Edin.),
Late Resident House-Physician to the Brompton Hospital for
Diseases of the Chest, London, S.W.

As their comparative rarity is probably the reason why mediastinal new growths have seldom been considered from a statistical standpoint in recent years, it may be worth while to record some data obtained from a consecutive study of 60 complete cases at the Brompton Hospital for Diseases of the Chest.†

ETIOLOGY.

At present we have no certain knowledge of the etiology of tumours in general. Various isolated facts bearing on their causation have from time to time been established, and these necessarily play an important part in the formation of any theory as to their true etiology.

With a large number of cases of such a relatively rare condition as new growth of the mediastinum under consideration, statistical data must naturally be of some importance, and the following points will first be considered:—(1) The Relative Frequency of the Condition. (2) The Age of Onset. (3) The Influence of Occupation and Locality. (4) The Sex Incidence. (5) The Influence of Heredity—(a) Malignant; (b) Tuberculous. (6) The Influence of Personal Tuberculosis.

Relative Frequency.—A mediastinal growth is usually considered to be a moderately rare disease. Between 1900 and 1913 inclusive, 20,745 patients were admitted to the Brompton Hospital, and of these 80 were unquestionably cases of mediastinal new growth, *i.e.* 1 in every 259 admissions was a mediastinal tumour. This large number really gives a somewhat false impression of the true frequency of the condition, because Brompton is exclusively a chest hospital, and obscure cases naturally gravitate into its wards. Still, it shows that the condition is not so uncommon as is generally supposed. Dr. F. de Havilland Hall, making statistics in a similar way at the Westminster Hospital (*i.e.* a *general* hospital),

* A short abstract of a thesis presented to the University of Edinburgh for the degree of M.D.

† There were 80 cases between 1900 and 1913, but necropsies were obtained in 60 only. There were, in addition, several cases of lymphadenoma, which have not been included in the series.

found 1 in 360 was the proportion of intra-thoracic new growths to medical admissions.

The mediastinum is far from being the commonest situation of new growths in the body. Herriek, in 1121 post-mortem examinations, found 68 cases of malignant disease, but in only 6 was it present within the thorax.

Wiczkowski has recently stated that mediastinal tumours, like cancers in general, are apparently increasing in frequency. In the present series it was impossible to corroborate this statement to any extent. The accompanying graph (Fig. 1) shows a slight upward tendency, but it is not sufficient to base any definite conclusions upon.

Age of Onset.—Dr. Angel Money records a case of malignant

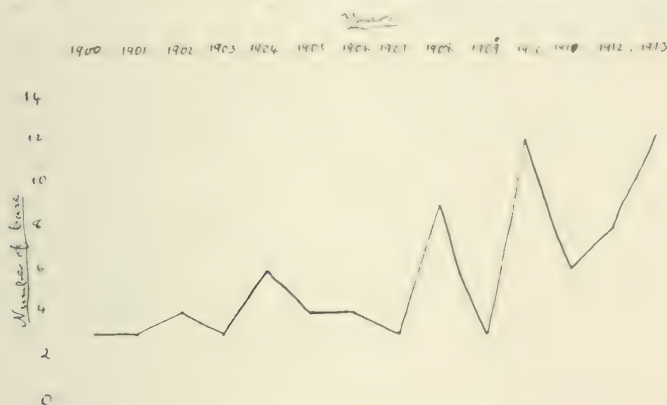


FIG. 1.—Graph illustrating an apparent increase in frequency of malignant disease of the mediastinum between 1900 and 1913.

mediastinal growth in an infant aged 18 months, and Hare one in a child aged 5 years. Such, however, are quite exceptional. The disease is much commoner at certain periods of life.

Under 20 years of age there were 2 cases.					
20 to 30	"	"	"	7	"
30 to 40	"	"	"	14	"
40 to 50	"	"	"	28	"
Over 50	"	"	"	9	"

In brief, 85 per cent. of cases were found to be over the age of 30 years, and 70 per cent. between the ages of 30 and 50 years. The extremes were 18 years and 70 years (Fig. 2).

Occupation and locality were apparently of no etiological significance. The patients were all of the hospital class, and no particular occupation or locality was predominant. Even

after going carefully into the question of indoor and outdoor occupations, no conclusions could be drawn. Hesse records that 75 per cent. of miners at Schneeberg die of "cancer" of the lung spreading from the root. These cases were apparently not verified by post-mortem and microscopic examination, so it is quite con-

AGES OF PATIENTS.

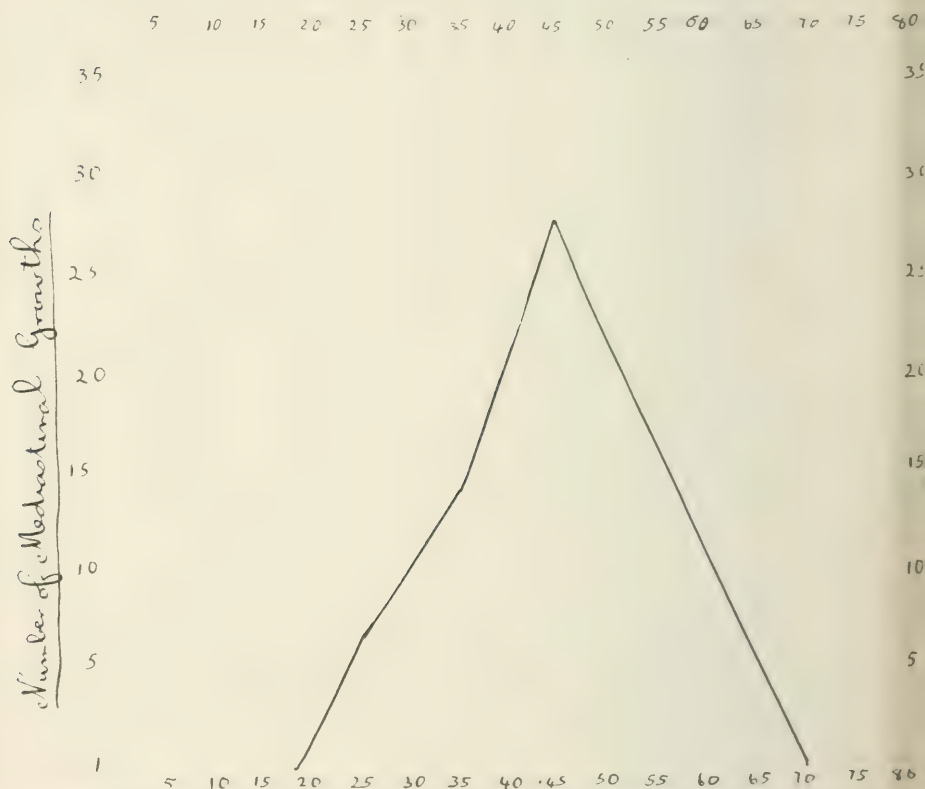


FIG. 2.—Graph illustrating the gradual increase as age advances until it reaches its maximum between the ages of forty and fifty years, after which it gradually decreases.

ceivable that a large number of them were in reality a variety of pneumonokoniosis.

See Incidence.—Men were affected much more frequently than women, the proportion being 2·15:1.

The sex, however, seemed to have a determining factor as to the variety of tumour found. Whilst in both sexes sarcoma was the commonest form, in females carcinoma was, relatively speaking, three times as frequently met with as in males.

Males.	{	Carcinoma	4 cases	} Carcinoma	
		Sarcoma	33 "		} 1 in 19.25.
		Unclassified	4 "		
Females.	{	Carcinoma	6 cases	} Carcinoma	
		Sarcoma	11 "		} 1 in 3.16.
		Unclassified	2 "		

Heredity.—Hospital records, as a rule, yield little direct information on problems of heredity. As so large a proportion of the cases admitted to the Brompton Hospital are tuberculous in nature, it has always been the custom to inquire very carefully into the health of father, mother, sisters and brothers, and in the present series inquiries were always made as to any family history of tuberculosis and malignant disease.

Only 23.5 per cent. gave a definite malignant family history, whilst in 31.6 per cent. there was a definite tuberculous family history. In 6.6 per cent. there was both a malignant and a tuberculous history. These figures tend to confirm Roger Williams' conclusion that, in malignant disease in general, it is much commoner to find a tuberculous than a malignant family history.

Personal Pulmonary Tuberculosis.—In 41.6 per cent. definite post-mortem evidence of tuberculosis was found within the chest, but in only 2 cases were tubercle bacilli actually demonstrated in the sputum. These figures closely coincide with those of Kurt Wolf, who, in 31 cases of malignant disease of the body in general, found evidence of pulmonary tuberculosis in 13 cases (*i.e.* in 42 per cent.).

The exact significance of these figures is somewhat difficult to interpret, as it is somewhat generally believed that the post-mortem examination of adults who have died of diseases other than tuberculosis present tubercular lesions in quite as large a percentage.

PATHOLOGY.

Situation of the Growth.—The data confirmed the general impression that the common seat of origin was the anterior mediastinum. In 68 per cent. of cases the anterior glands were primarily affected, though in 21 of these the disease had spread to involve the posterior and bronchial glands as well.

From the mediastinal glands the disease spreads to surrounding parts, especially involving the pericardium and root of the lung. From there it radiates out in a series of finger-like processes along the course of the bronchi into the pulmonary tissue (*vide* Fig. 6).

Nature of Tumour.—In the series there was not a single example of an innocent growth; all were definitely malignant in character.

Hare, in his classical work on mediastinal new growths, pointed out that carcinoma was much commoner than sarcoma. In the present series the exact opposite was the case, there being 44 examples of sarcoma and only 10 of carcinoma. I venture to believe these figures are more accurate than Hare's, because this is a continuous series, and practically every case was examined microscopically. Hare's series was based upon a collection of isolated cases published from time to time, and only 9 per cent. were verified microscopically. The Brompton figures showed that of the 44 cases of sarcoma 32 were lympho-sarcoma.

Spread to Lung Tissue.—In 93·3 per cent. of cases the disease spread before death to involve the lung tissue.

The right lung alone was involved in	29 cases.
The left lung alone was involved in	13 „
Both lungs were involved in	14 „
Neither lung was involved in	4 „

I.e. the right lung was affected in 71·6 per cent. of cases.

Extra - thoracic metastases frequently occur, and are very diagnostic. The commonest combination was found to be an involvement of liver, pancreas, and suprarenals.

No evidence of secondary growth in	16 cases.
Liver metastasis in	21 „
Pancreas metastasis in	14 „
Suprarenal metastasis in	10 „
Kidney metastasis in	9 „
Spleen metastasis in	7 „
Thyroid metastasis in	1 case.
Brain metastasis in	1 „
Ovary metastasis in	1 „

SYMPTOMATOLOGY.

A consideration of these cases showed that it is quite impossible to portray a clinical picture which will hold good in every case of mediastinal growth. The mode of onset and the severity and duration of practically every symptom differ in nearly every case.

A small mediastinal tumour, so situated as not to give rise to pressure symptoms, is often quite unrecognisable, except on the post-mortem table. On the other hand, a tumour of similar size may by its situation give rise to very grave symptoms, and yet nothing be found after careful clinical examination of the chest.

The following symptoms appeared to be of some diagnostic significance:—

Emaciation.—This was, as a rule, conspicuous by its absence.

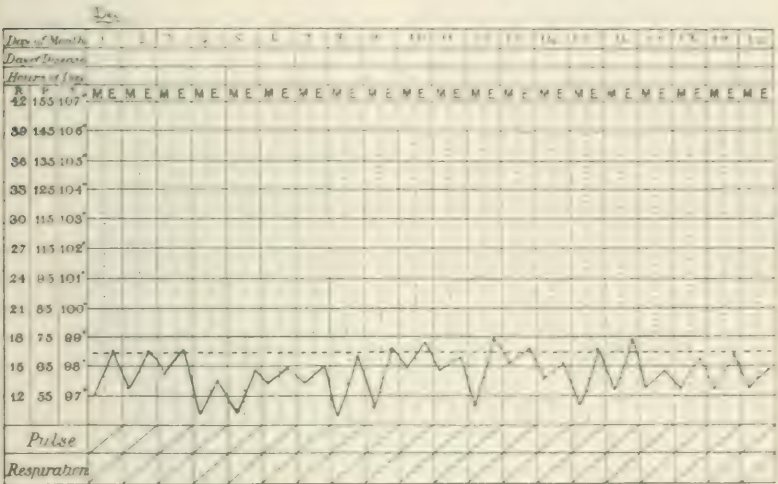


Fig. 3.—Temperature chart of a case of mediastinal lymphadenoma with intermittent fever.

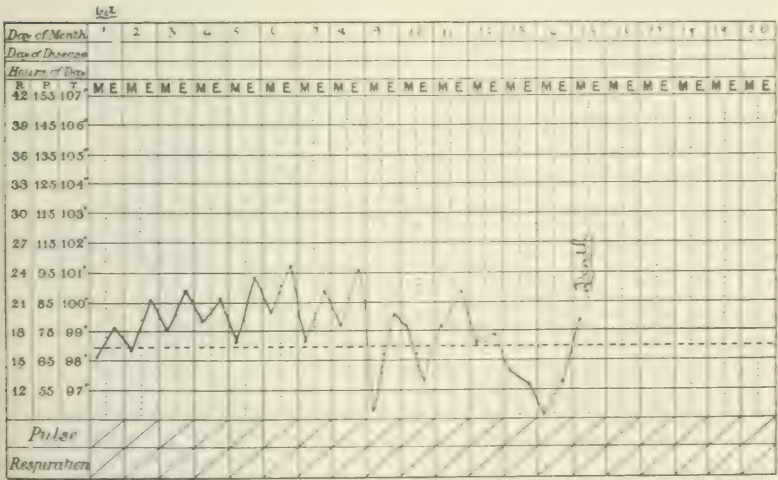


Fig. 4.—Temperature chart of a case of mediastinal lymphadenoma complicated by septic pneumonia.

Though it was not the custom to weigh the body after death, the post-mortem records appeared to show that patients with malignant disease of the mediastinum lose little more weight than other patients confined to bed for a similar length of time. The typical

cachexia associated with malignant disease elsewhere in the body was never found to be present.

Pyrexia.—Examination of 60 charts showed that in no case was the temperature above 100° F., unless some complication supervened. The common cause of a continued high temperature was bronchiectasis or septic broncho-pneumonia. In most cases there were long periods of persistently subnormal temperature, with an occasional sudden rise and fall.

Pressure symptoms were present to a greater or less extent in practically every case.

Pain was usually present at some period of the disease. It was generally dull and aching in character, but sometimes came on in exceedingly severe paroxysms. The causation of the pain varied in different cases, *e.g.*:—

1. One patient complained of a persistent dull pain in the left side of the chest, which quite disappeared after aspiration of three pints of fluid from the left pleural sac.

2. If the disease spreads through the lung and involves the pleura, a typical pleuritic pain is found.

3. Involvement of the intercostal nerves may give rise to severe pain.

4. Erosion of the vertebrae or sternum produces the typical boring pain of bone disease.

Pain is by no means always confined to the thorax. In two cases under observation it radiated down the arm to the fingertips, and post-mortem examination showed that the brachial plexus was pressed upon.

Dyspnoea was sometimes the first symptom. It usually develops insidiously, but generally sooner or later becomes very prominent. Dyspnoea, out of proportion to the physical signs found, is very characteristic of the condition.

Its chief causes were found to be:—

1. Pressure of a pleural effusion.

2. Pressure on the trachea or a main bronchus (*vide* Fig. 5).

3. Vagal irritation.

4. A plug of mucus blocking the lumen, which is already narrowed by one of the above causes.

A curious point noticed in the post-mortem room is that when the vagus nerve is implicated it is practically always only pressed upon by, and rarely infiltrated with, the disease. In most cases the nerve can easily be dissected out from the surrounding new growth.



FIG. 1.—The right hemisphere is marked by a black cross. The tumor had been removed from the left hemisphere also. A small, thin, pale, white, and yellowish patch of recent hemorrhage is seen. Prepared and colored by Dr. H. A. Ford, Lecturer on Anatomy, The Birmingham Hospital Museum.

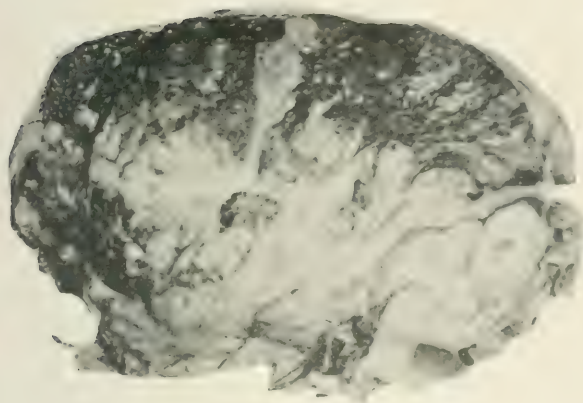


FIG. 2.—A section of the right hemisphere. The tumor had been removed from the left hemisphere also. A small, thin, pale, white, and yellowish patch of recent hemorrhage is seen. Prepared and colored by Dr. H. A. Ford, Lecturer on Anatomy, The Birmingham Hospital Museum.

Hoarseness was a common feature, and was due to pressure on either the recurrent laryngeal or vagus nerves. A laryngoscopic examination is of great diagnostic value in all cases, as often a slight abductor paralysis can be detected before there are any symptoms indicative of pressure upon the nerve.

Dysphagia was often present, due to pressure on the oesophagus. Rarely was the oesophagus itself infiltrated by the disease.

Vomiting due to vagal irritation was occasionally found.

Hiccough was in one case a very distressing and quite uncontrollable symptom. It was due to pressure on the phrenic nerve.

Eye changes due to pressure on the sympathetic nerve were fairly frequent. As a result, one would expect to get first dilatation and later contraction of the pupil of the affected side. Clinically, however, dilatation is rarely seen. Contraction of the pupil from the very first is much more commonly found.

Sudden oedema of the face and neck was often an early symptom, and is of the very greatest diagnostic significance. In many cases, in addition, the superficial veins of the thorax became dilated and tortuous. Though pressure on the superior vena cava was relatively common, in no case was there any mention of pressure on the inferior vena cava. In addition, the arteries always escaped compression. This is an important point in the diagnosis from a thoracic aneurysm.

Hæmoptysis was seldom severe, but in three cases it was the actual cause of death. In 63 per cent. of cases blood was definitely present in the sputum at some period of the illness, but in the great majority of cases the amount was small and not frequently repeated.

Sputum.—The expectoration was as a rule scanty, thick, and mucoid, and in no case could any malignant cells be demonstrated in it. The most characteristic feature was the repeated absence of tubercle bacilli, though in two cases they were definitely present.

Physical Signs.—Percussion was found to be the most valuable and reliable of the ordinary methods of examination, though it was by no means the rule to find the classical sub-manubrial dullness indicative of a growth in the superior mediastinum. In any case at all suggesting a mediastinal neoplasm it is essential that a careful abdominal examination should be made for the presence of secondary growths. As mentioned before, these are most commonly found in the liver, pancreas, spleen, and suprarenals, and are often very easily palpable.

In the last two cases under my observation there were definitely enlarged cervical glands which were undoubtedly malignant in nature. This seems to corroborate Sir R. W. Philip's much-criticised contention that the supra-clavicular lymphatic glands are definitely connected with the thoracic contents.

Pleural Effusion.—In 60 cases there was found:—

No effusion	31 cases.
Effusion definitely hæmorrhagic	15 ..
Effusion present, but containing no naked-eye evidence of blood	14 ..
Cancer cells present	3 ..
Acid-fast bacilli (? tubercle) present	1 case.

This shows that in 51 per cent. of cases of malignant pleural effusion blood is recognisable to the naked eye. Formerly a hæmorrhagic effusion was thought to be pathognomonic of malignant disease, but I have frequently found it in tuberculous effusions due probably to the puncture of a small vessel during the operation.

Microscopic examination of the effusion is of little diagnostic value, as cancer cells are rarely present. A high percentage of lymphocytes is thought by many to be indicative of tuberculosis, but in reality it is very commonly met with in malignant disease. In a recent case under my observation 96 per cent. of the cells present were lymphocytes.

In most cases the effusion developed insidiously with few symptoms and no pyrexia.

Radiography.—A radiographic examination was found to be of great value in the hands of a skilled operator; in the first place, it may show the actual presence of a growth; secondly, in conjunction with a bismuth meal or the passage of a bismuth bougie, signs of œsophageal pressure may be determined; and thirdly, it gives great assistance in the differential diagnosis from thoracic aneurysm.

PROGNOSIS.

Most of the cases ran a more or less chronic course, and all were fatal. Dating the duration as accurately as possible from the first symptom complained of to the date of death I found:—

The minimum duration was	9 weeks.
.. maximum	88 ..
.. average	32 ..

Jaccoud, however, records a case of a patient who died in 9 days, and Hertz one who lived for 7 years.

It was impossible to trace any direct relation between the duration of the disease and the age of the patient, but the tendency

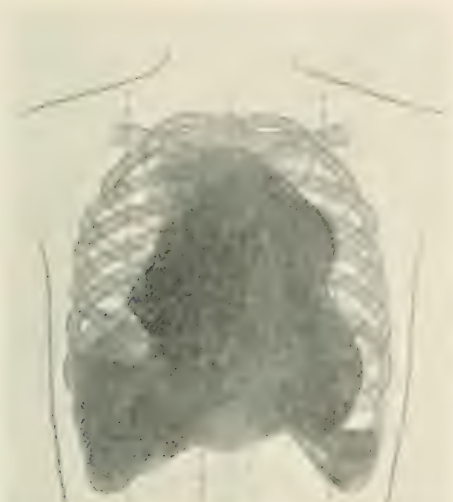


FIG. 7. — Roentgen-ray radiogram showing the sharply defined edges of the mass. (See Fig. 8.)

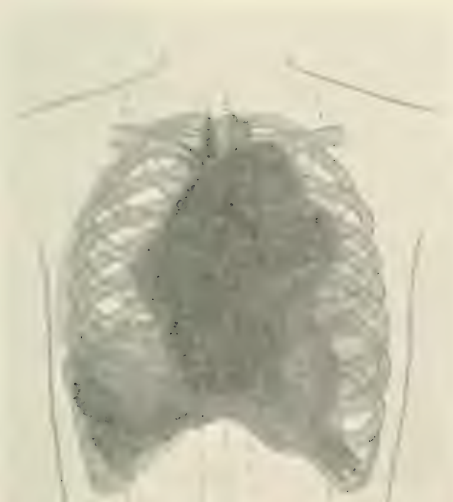


FIG. 8. — Roentgen-ray radiogram of the same region as Fig. 7, taken three weeks later, showing the edge of the growth merging into the surrounding tissues. (Roentgen-ray by Dr. Stanley Murray.)

seemed to be that the younger the patient the more rapid was the course of the illness.

The Causes of Death were:—Exhaustion, 43 cases; asphyxia, 11 cases; hæmoptysis, 3 cases; cardiac failure, 2 cases; cerebral tumour, 1 case.

CONCLUSIONS.

The study of these 60 cases of new growth of the mediastinum leads to the following conclusions:—

1. Malignant disease of the mediastinum is not so rare as is generally supposed, whereas innocent tumours of the mediastinum are exceedingly rare in this country.

2. It is essentially a disease of early middle life (30 to 50 years of age), but it may occur at any age.

3. It seems to be increasing in frequency.

4. The disease is twice as common in males as in females.

5. A definite tuberculous history is often found, and is commoner than a malignant family history.

6. Though tubercle bacilli are rarely present in the sputum, there is possibly some relationship between pulmonary tuberculosis and new growth of the mediastinum.

7. The anterior mediastinum is the common seat of origin.

8. Sarcoma is the commonest form of malignant disease of the mediastinum in both sexes, and it usually takes the form of lympho-sarcoma.

9. Carcinoma of the mediastinum is, relatively speaking, much more commonly found in females than in males.

10. The lungs are practically always affected sooner or later, and pulmonary symptoms are generally present. The right lung is much more frequently affected than the left lung.

11. Extra-thoracic metastases are very common and often very palpable.

12. If pyrexia be present, it is due to some complication supervening upon, or caused by, the original condition.

13. Microscopic examination of the sputum is rarely of any diagnostic value, but the persistent absence of tubercle bacilli in a case suggesting pulmonary tuberculosis is very significant.

14. Hæmoptysis, though moderately common, is rarely severe.

15. A pleural effusion is often present and it is often hæmorrhagic, but a hæmorrhagic effusion is not pathognomonic of malignant disease.

16. Microscopic examination of the pleural fluid is rarely of any diagnostic significance. A large proportion of lymphocytes is quite as commonly found in a malignant as in a tuberculous effusion.

In conclusion I wish to acknowledge my indebtedness to the medical committee of the Brompton Hospital for permission to make use of the clinical and post-mortem notes of the cases upon which this paper is based.

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PERFORATED GASTRIC ULCER: *A Collective Report on a Series of 247 Cases of Perforated Gastric Ulcer treated in Edinburgh between 1896 and 1913. Compiled from Data furnished by F. M. CAIRD, J. M. COTTERILL, C. W. CATHCART, JAMES HODSDON, DAVID WALLACE, ALEXIS THOMSON, H. J. STILES, ALEXANDER MILES, J. W. DOWDEN, A. A. SCOT-SKIRVING, GEORGE L. CHIENE, W. J. STUART, J. W. STRUTHERS, H. WADE, E. SCOTT CARMICHAEL, D. P. D. WILKIE, L. C. PEEL RITCHIE, DENIS COTTERILL, and LEWIS BEESLY.*

A LITTLE over a year ago we published in the *Journal* (November 1913) a collective report on a series of 200 cases of perforated duodenal ulcer which had been treated in Edinburgh between 1896 and 1912.

It was felt that that inquiry might be usefully supplemented by a similar analysis of the records of the cases of perforated gastric ulcer treated by the surgeons of the Edinburgh school. This investigation has since been carried out, and the results are embodied in the present report. As the material for these investigations was derived from the same sources, and for all practical purposes was dealt with by the same surgeons, the data obtained may be considered reliable for purposes of comparison.

The period embraced in the present study includes the years 1896 to 1913, one year more than in the previous inquiry.

During the 17 years the total number of cases of perforated gastric ulcer dealt with was 247.

Annual Incidence.—In our report on perforated duodenal ulcer attention was drawn to the remarkable increase in the number of cases that had come under observation in recent years. It will be seen from Table I. that this applies within limits to perforated gastric ulcer.

*Perforated Gastric Ulcer*TABLE I.
Total No. 247.

	Number each year.		Number each year.		Number each year.
1896 . . .	3	1902 . . .	8	1908 . . .	16 .
1897 . . .	5	1903 . . .	8	1909 . . .	19
1898 . . .	2	1904 . . .	18	1910 . . .	22
1899 . . .	4	1905 . . .	21	1911 . . .	16
1900 . . .	6	1906 . . .	15	1912 . . .	21
1901 . . .	18	1907 . . .	24	1913 . . .	21

In the first three years of the period (1896-1898) there were 10 cases—an average roughly of 3 each year; during the following 5 years (1899-1903) there were 44 cases (average 9); during the next 5 years (1904-1908) 94 cases were treated (average 19); and in the last 5 years (1909-1913) 99 cases (average 20).

TABLE II.

	1886-1898.	1899-1903.	1904-1908.	1909-1913.*
<i>Gastric perforation</i> . . .	10 cases.	44 cases.	94 cases.	99 cases.
	1896-1902.	1903-1907.	1908-1912.	
<i>Duodenal perforation</i> . . .	12 cases.	43 cases.	145 cases.	

The increase within the last quinquennial period is not so marked in the gastric as in the duodenal series (Table II.); a glance at Table I. shows that for the last 10 years the annual number has been remarkably constant. This confirms the opinion expressed in our previous report, that the great increase in the number of perforated duodenal ulcers recorded from 1908 onwards was not due to more accurate discrimination between gastric and duodenal perforations. It is to be borne in mind that the recognition of ulcer of the duodenum as a clinical entity is of comparatively recent date, and that many of the previous cases were probably classified as peritonitis of undiscovered origin.

Table III. shows the mortality in each of the periods.

TABLE III.

	Total.	Average per year.	Recovered.	Fatal.	Mortality.
I. 1896-1898 (3 years)	10	<i>circa</i> 3	3	7	70 per cent.
II. 1899-1903 (5 ")	44	" 9	17	27	61 "
III. 1904-1908 (5 ")	94	" 19	58	36	38 "
IV. 1909-1913 (5 ")	99	" 20	64	35	35 "

Method of Investigation.—The material for this inquiry was obtained in the same manner as in that of last year. A schedule (p. 457) was drawn up, and was filled in by the individual operators, after which the data were analysed and tabulated by the Committee.*

* The Committee consisted of Messrs. J. W. Struthers and D. P. D. Wilkie and the Editors.

SCHEDULE. INQUIRY *IN* PERFORATED GASTRIC ULCER.

	Clinical Features of Perforation.	Operation.	Recovery.
Date of operation.	<i>Pain at onset.</i>	Time since perforation.	<i>Recovery.</i>
Name or initials.	Severity.		Date of last report.
Sex.	Site of maximum.	Anæsthetic used.	Source of information.
Age.	Radiation.	Nature of fluid in abdomen.	Condition then as to general health and indigestion.
Occupation.	Subsequent modifications of pain.	Distribution of.	
History of indigestion.	<i>Vomiting—</i>	Amount of.	
(Detail symptoms.)	Time.	Food matter.	
	Severity.	<i>Perforation—</i>	
	Material.	Site of.	
	<i>Tenderness—</i>	Size of.	
	Site of maximum.	Evidence of other ulcers.	
Was Ulcer diagnosed before present illness?	<i>Rigidity—</i>	Adhesions.	
	Site of maximum.	<i>Method of dealing with perforation.</i>	<i>Any subsequent treatment—</i>
Was there Hæmatemesis?	<i>Liver Dulness—</i>	Suture alone.	Medical.
	Present.	Suture with omental graft.	Surgical.
Was there Melæna?	Diminished.	Excision of ulcer.	<i>Fatal.</i>
	Lost.	Pyloroplasty.	Time of death after operation.
Signs premonitory of perforation.	<i>Tympanitis.</i>	Was gastro-enterostomy done?	Cause of death.
Possible factors determining perforation.	<i>Shock—</i>	Why?	P.-M. Report.
Relation to last meal.	Intensity.	<i>Means of cleansing peritoneum.</i>	<i>Operator's Remarks.</i>
Any other important facts antecedent to perforation.	<i>Reaction period—</i>	Drainage—	
	Time of onset.	Site.	
	Duration.	Duration.	
	<i>General condition of patient before operation—</i>	Healing of wound.	
	Hopeful.	Post - operative complications.	
	Grave.	Any other important facts regarding operation or convalescence.	
	Moribund.		
Food or medicine taken after perforation.	<i>Diagnosis when first seen by own Doctor.</i>		
Was morphia given after perforation?	<i>Diagnosis immediately before operation.</i>		

Sex and Age Incidence.—Of the 247 gastric cases, 77 were males and 170 females, a ratio of 2.2 females to 1 male. This shows a much higher incidence of perforation among males than most statistics. In the series of 200 duodenal cases, 179 were males and 21 females, a ratio of 8.5 males to 1 female.

TABLE IV.

31 patients were under 20 years of age.					
101	"	"	between 20 and 30 years of age.		
57	"	"	"	30 and 40	" "
29	"	"	"	40 and 50	" "
18	"	"	"	50 and 60	" "
10	"	"	"	60 and 70	" "
1	"	"	"	70 and 80	" "

It will be seen from Table IV., which shows the age incidence, that the main incidence of the affection was in patients below the age of 40, and that a large proportion of the cases occurred between the ages of 20 and 30. The number of cases occurring in persons past middle life, however, shows that this condition is not to be neglected in the differential diagnosis of acute abdominal catastrophes at any period of life. The records show that perforation occurs in males at a later age than in females, the average age of the males being about 37, and of females about 25. The youngest patient treated was a boy of 12½; the oldest a man of 71. The duodenal cases showed a somewhat later incidence, being fairly evenly distributed between the ages of 20 and 50.

Occupations of Patients.—As was noted in the duodenal series, the occupation of the patient did not seem to have any bearing on the question of perforation. A considerable proportion of the female patients were of the domestic servant and shop-girl class; the male patients followed many and varied occupations.

CLINICAL FEATURES.

History of Indigestion previous to Perforation.—The difficulty of obtaining from a patient suffering from perforation an accurate history regarding the early symptoms of an illness which has probably lasted for many years is readily understood, but the available records make it abundantly clear that in the vast majority of cases the patient suffered from indigestion of a severe type for long periods before perforation occurred. Only in 11 cases is it definitely stated that no such history was forthcoming. In a large number the presence of ulcer had been definitely diagnosed by the

usual symptoms, and the patients had been treated more or less systematically for this condition. Hematemesis was much more common in women than in men.

TABLE V.

Previous History of Indigestion or Ulcer.

<i>History of Indigestion.</i>	None.	Slight.	Well-developed.	Insufficient data.
247	11	53	146	37
<i>History of Perforation.</i>	None.	Slight.	Well-developed.	Insufficient data.
200	17	55	90	38

From Table V, it will be observed that gastric ulcers which go on to perforation are more frequently associated with severe dyspepsia than are duodenal ulcers, and that an entire absence of antecedent indigestion is commoner in duodenal cases.

Prenonitory Signs of Perforation and Factors determining its Occurrence.—As was the case in the duodenal series, no information could be elicited in the records of gastric perforations to indicate that the occurrence of perforation is heralded by any characteristic symptoms. In several cases the indigestion had been distinctly worse than usual for some days before; but no stress can be laid upon this point, as similar exacerbations had frequently been experienced apart from perforation. Nor did we find anything convincing in the statements made by the patients regarding the determining cause of perforation. In several cases the acute pain came on suddenly while a severe muscular effort was being made—*e.g.* a nurse lifting a patient, a woman stretching to hang clothes on a rope, a man making a heavy lift at his work, and so on. It is conceivable that a severe muscular effort might determine the actual rupture of an ulcer the base of which had become greatly attenuated, but this would merely amount to the hastening of what would have occurred in time by purely pathological processes. In one case, in which a band of omentum was adherent to the stomach over the ulcer, and in which the perforation took the form of a longitudinal tear, there was reason to believe that the lesion was produced by the patient stretching to reach a high object. This point might have a medico-legal bearing in connection with claims for compensation. Two patients had just taken an unusually heavy meal; one was straining at micturition. One woman alleged that she had been assaulted, and her assailants were for a time under arrest. Fortunately, she recovered; and as the charge was departed from, the question of the relationship between the trauma and perforation did not require to be decided.

The entrance of food into the stomach does not appear to have any determining influence on perforation. It is true that in several cases the patient had just completed an unusually hearty meal; but in a considerable proportion of the cases in which the point is noted the perforation occurred within 2 hours of a meal, and in others it was 6, 7, or even 10 hours since food had been taken. Nor is there any evidence that the condition of the stomach as regards food has any influence on the mortality.

Signs and Symptoms following Perforation.—As was noted in the duodenal cases, in practically every case the initial symptom was agonising pain in the epigastrium coming on with great suddenness and severity. The nature, mode of onset, and site of the pain are so characteristic and constant as to constitute important diagnostic features of perforation of an ulcer as distinguished from acute appendicitis and the various forms of abdominal colic.

Site of Pain.—In the great majority of cases the pain was situated in the epigastrium and, as a rule, towards the left of the middle line. This is in contrast with the duodenal cases, in which it was clearly brought out that the pain was usually felt towards the right of the middle line. In several cases the patient complained of generalised abdominal pain; in a few it was vaguely referred to the lower part of the abdomen, and in 6 cases it was chiefly complained of in the right iliac fossa. In comparatively few cases is any record made regarding radiation of the pain; in 4 it shot through to the back between the shoulder-blades, in 3 to the left scapula, in 3 down the left side, in 1 to the left upper arm, and in 1 to the right axilla.

Vomiting.—Vomiting is a much more common symptom in perforation of the stomach than in duodenal perforation. In the gastric series 96 vomited soon after perforation, and in only 24 was it definitely recorded that no vomiting occurred. As in duodenal cases, prolonged or repeated vomiting is of grave significance, especially when the vomited matter is coffee-ground.

Examination of Abdomen—Site of Maximum Tenderness.—In the great majority of cases the maximum tenderness was over the epigastric and left hypochondriac regions, and this was found to correspond fairly accurately with the site of the perforation. There were exceptional cases, however, because in 10 the tenderness was most marked to the right of the middle line, in 4 it was below the level of the umbilicus, and in 11 it was definitely in the right iliac fossa. In only one case was supra-

public tenderness specially noted, in another there was tenderness in both flanks, and in one it is stated that there was no tenderness.

Site of Maximum Muscular Resistance.—In the majority of cases, by the time the patient came under observation, general muscular rigidity was present, but in a considerable number of cases the upper part of the abdomen was tighter than the lower part and the left rectus was more firmly contracted than the right. In 5 cases the rigidity was most pronounced in the appendicular region.

Modification of Liver Dulness.—In 48 cases it was recorded that the area of liver dulness was normal, in 58 it was diminished, and in 69 it was lost. Diminution or loss of liver dulness was recognised, therefore, in 127 of the 175 cases in which this point was noted.

TABLE VI.

Modification of Liver Dulness.

<i>Gastric Perforations.</i>	Normal.	Diminished.	Lost.	No Note.
247	48	58	69	72
<i>Duodenal Perforations.</i>	Normal.	Diminished.	Lost.	No Note.
200	58	46	43	53

Table VI. shows that some modification of the liver dulness is more frequent in gastric than in duodenal perforations.

Reaction Period.—In a considerable proportion of cases note is made of a definite period of reaction coming on within from 2 to 5 hours of the perforation, and lasting for some hours. During this time the more acute symptoms abate, and the patient both looks and feels better. The importance of recognising this phase of the illness lies in the fact that the improvement may suggest that the original diagnosis was wrong, or may deter the surgeon from urging the necessity for immediate operation. As the recurrence of the acute symptoms usually indicates the onset of peritonitis, valuable time may thus be lost and the chances of the patient be seriously prejudiced.

OPERATION.

Anæsthetic.—Chloroform was the anæsthetic employed throughout in about two-thirds of the cases; in most of the remaining third ether was given after anæsthesia had been induced by chloroform, and in some ether alone was used. So far as the records show, the anæsthetic employed has no influence on the

issue. In 2 cases the operation was performed under local anæsthesia.

Nature of Fluid in Abdomen.—As a rule the fluid in the abdominal cavity consisted of turbid peritoneal exudate, and the quantity present did not appear to bear any constant relation to the duration of the condition; in some quite recent cases a large quantity was found both at the seat of the perforation and in the pouch of Douglas. In those cases in which a considerable time had elapsed since the perforation occurred, the fluid was usually thicker, and in cases of still longer standing it was sero-purulent or purulent. Those cases in which there was an excessive quantity of fluid were usually attended with a considerable degree of shock, and generally proved fatal. In 6 cases bile was present in the exudate, and all of these proved fatal. As might be expected, the duodenal series contained a larger proportion of cases in which bile was present in the exudate, and these cases also showed a high mortality.

Stomach contents were frequently noted as having been found in the exudate, sometimes only in that immediately adjacent to the perforation, sometimes in the pouch of Douglas. The substances recognisable included curdled milk, fragments of fish and meat, peas, potatoes, grains of raw rice (which the patient had been in the habit of eating), castor-oil, and whisky. It is a remarkable circumstance that the great majority of these cases recovered. Free gas was noted as present in the general peritoneal cavity in about 50 cases, but its presence did not appear to be of any definite significance.

Distribution of Fluid.—The fluid did not tend to accumulate except under the liver and in the pouch of Douglas. In 5 cases there was fluid in the lesser sac, and of these 3 were fatal.

Site of Perforation.—The site of the perforation was recorded in 235 of the cases. The distribution of the lesions is indicated in Table VII.

TABLE VII.

Perforations in anterior wall (209)	{	Near lesser curvature (207)	{	In pyloric portion	116
				In middle portion	54
Perforations in posterior wall (19)	{	Near greater curvature (2)	{	In cardiac portion	37
				In middle portion	2
Perforations on hour-glass constriction of stomach	{	Near lesser curvature	{	In pyloric portion	12
				In middle portion	2
				In cardiac portion	5

It will thus be seen that the most common site of perforation is on the anterior wall of the pyloric portion of the stomach near to the lesser curvature. Perforations on the posterior wall, which are comparatively rare, are most frequently towards the pyloric end. The occurrence of perforation in 7 cases of hour-glass constriction is interesting. Perforation on the posterior wall did not show a relatively higher mortality than those on the anterior wall, nor did the segment of the stomach implicated seem to influence the mortality.

The great majority of the perforations varied in size between a pin-head and the calibre of a lead pencil. Several were large enough to admit the tip of the index finger, and one or two were larger. As was noted in the duodenal series, the larger perforations were on the whole more fatal than the smaller ones. The ulcers varied greatly in size, some being as large as a half-crown piece, and so far as the records bore they were practically all of the chronic indurated type with thickened and shelving edges.

Presence of other Ulcers.—In less than 2 per cent. was more than one ulcer observed. In one case two perforations were found in the stomach, and in another a perforation had also occurred in the duodenum, the resulting exudate being confined by adhesions to the head of the pancreas.

Presence of Adhesions.—The replies to the inquiry regarding the presence of adhesions did not discriminate sufficiently between recent adhesions resulting from the irritation of the peritoneum following the perforation, and organised adhesions associated with the pre-existing ulcer, to admit of any conclusion being arrived at as to their frequency or importance. In several cases old-standing omental adhesions had walled off the exudate and led to the formation of a localised perigastric abscess.

Method of Dealing with Perforation.—Table VIII. indicates the various methods adopted for dealing with the condition found at operation and the results.

TABLE VIII.

	Cases.	Recovered.	Fatal.
Suture alone	146	90	56
Suture with omental graft	41	20	21
Excision of ulcer	14	7	7
Pyloroplasty	5	4	1
Gastroplasty	1	1	...
Partial gastrectomy	1	1	...
Gastrostomy	1	1	...
Not closed—Drained	3	1	2
Gastro-enterostomy after closure of perforation	29	21	8

In one case in which the walls of the ulcer were so thick that the edges could not be invaginated by sutures, a rubber tube was introduced through the perforation and the stomach wall folded over it after the method of Witzel; the patient made an excellent recovery and the fistula gradually closed. The relatively high mortality in the group in which the line of sutures was supplemented by an omental graft cannot be attributed to the method adopted.

Cleansing of Peritoneal Cavity.—The method adopted to cleanse the peritoneal cavity is reported in 203 cases. The whole abdominal cavity, including the pouch of Douglas, was irrigated with warm saline solution in 143 cases, of which 85 recovered and 58 died. The soiled areas were swabbed out with gauze in 41 cases, with a mortality of 10. In 19 cases, for one reason or another, no special steps were taken to cleanse the cavity, and of these 14 recovered and 5 died. It would be fallacious from these figures alone to argue in favour of one or other of the methods. Many of the cases were operated upon before the advantages of the Fowler position and rectal infusions of saline solutions were fully appreciated in the treatment of peritoneal infections, and when irrigation and drainage were the accepted procedures. The cases in which swabbing alone was relied upon were comparatively recent and had the benefit of the more modern measures.

It is interesting to compare these figures with those of the duodenal series.

TABLE IX.

		Irrigation.		Swabbing.		No Cleansing.
<i>Gastric perforations</i>	143	{ Recovered 85 Fatal . 58	41	{ Recovered 31 Fatal . 10	19	{ Recovered 14 Fatal . 5
<i>Duodenal perforations</i>	102	{ Recovered 54 Fatal . 48	54	{ Recovered 45 Fatal . 9	6	{ Recovered 3 Fatal . 3

From this table it would appear that swabbing alone was more efficacious in duodenal than in gastric perforations, while irrigation gave rather better results in the gastric cases.

Drainage.—In the great majority of cases a tube was introduced into the pouch of Douglas through a suprapubic wound, and was retained for several days. Drainage through the upper wound was employed in most of the earlier cases, but appears to have been gradually abandoned. In a number of cases where there were special indications, extra drains were introduced into the flanks and into the subphrenic space.

POST-OPERATIVE COMPLICATIONS.

As was found in the duodenal series, the most frequent complications after operation were affections of the respiratory system. Of these there were 31 (Table X.).

TABLE X.

	Cases.	Recovered.	Fatal.
Bronchitis	6	5	1
Pleurisy	7	5	2
Empyema	5	3	2
Pneumonia	11	5	6
Abscess of the lung	1		1
Pulmonary embolus	1	...	1
Total	<u>31</u>	<u>18</u>	<u>13</u>

The other complications met with, apart from those relating to the healing of the wound, are included in Table XI.

TABLE XI.

	Cases.	Recovered.	Fatal.
Subphrenic abscess	10	4	6
Gastric fistula	2	1	1
Intestinal obstruction	3	1	2
Volvulus (10 feet of intestine resected)	1	1	...
Parotitis	3	3	...
Phlebitis, leg	3	3	...
Delirium tremens	1	...	1
Suppression of urine	1	...	1
Total	<u>24</u>	<u>13</u>	<u>11</u>

From this list it will be seen that post-operative complications are more common after gastric than after duodenal perforations. In the 200 duodenal cases there were only 17 showing pulmonary complications, as against 31 in the 247 gastric cases. Subphrenic abscess is also proportionately more common: 5 cases occurred in the duodenal series, and 10 in the gastric.

A number of the cases suffered from post-operative hæmatemesis varying in degree and duration.

IMMEDIATE RESULTS.

In the series of 247 cases, 142 recovered and 105 died. Table XII. shows the mortality in each of the last three

quinquennial periods, and the period of three years prior to 1899.

TABLE XII.

	1896-1898 (3 years).	1899-1903 (5 years).	1904-1908 (5 years).	1909-1913 (5 years).
Recoveries	3	17	58	64
Fatal	7	27	36	35
Total	<u>10</u>	<u>44</u>	<u>94</u>	<u>99</u>

It will thus be seen that within the last ten years the results have materially improved; in the first period the mortality was 70 per cent.; in the second 61·3 per cent.; in the third 38·2 per cent.; and in the fourth 35·3 per cent. This corresponds pretty closely with what was found in the duodenal series, in which the mortality fell from 58·3 per cent. in the first period to 48·8 per cent. in the second and 36·5 per cent. in the third.

TABLE XIII.

Period which Elapsed between Perforation of the Ulcer and Operation.

A. In Cases which Recovered=135.

Hours—3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	+24
Cases—6	38	21	24	9	8	4	4	17

B. In Fatal Cases=98.

Hours—3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	+24
Cases—8	8	10	8	3	16	6	8	31

Table XIII. shows the number of hours which elapsed between the occurrence of perforation and operation, so far as this was noted in the schedules. It will be observed that out of the 135 cases which recovered, 89 (=65·9 per cent.) were operated upon within 12 hours of perforation, while of these operated upon later only 46 (=34·1 per cent.) recovered. A comparison with the duodenal series shows that 73·1 per cent. of the recoveries were operated upon within 12 hours, and only 26·9 per cent. later. Of the 98 fatal gastric cases only 34 (=34·6 per cent.) were operated upon within 12 hours, while 66 (=65·4 per cent.) were later. In the duodenal series 37·6 per cent. of the fatal cases were operated upon within 12 hours, and 62·4 per cent. later.

TABLE XIV.

Year.	No. of Recoveries.	No. of Recoveries Operated upon within 12 hours of Perforation.	No. of Failed Cases.	No. of Failed Cases Operated upon within 12 hours of Perforation.	Total Number of Cases.	Total No. of Cases Operated upon within 12 hours of Perforation.
1896	1	0	2	1	3	1
1897	1	0	4	1	5	1
1898	1	0	1	0	2	0
1899	1	1	3	2	4	3
1900	1	0	5	2	6	2
1901	5	4	13	3	18	7
1902	5	3	3	1	8	4
1903	5	3	3	2	8	5
1904	9	5	9	2	18	7
1905	12	3	9	2	24	5
1906	8	6	7	3	15	9
1907	16	15	8	2	24	17
1908	13	10	3	0	16	10
1909	11	9	8	1	19	10
1910	12	9	10	4	22	13
1911	10	7	6	2	16	9
1912	16	9	5	1	21	10
1913	15	6	6	2	24	6

The importance of early operation is emphasised by Table XIV., which shows the number of operations performed in each year, with the results and the number of cases in which the operation was performed within 12 hours of perforation. In commenting on a similar table relating to perforated duodenal ulcers in our previous report, it was noted that year by year a larger proportion of the cases came to operation within 12 hours of perforation, and that coincidentally the mortality was becoming less.

The statistics in Table XIV. do not reveal such a decided improvement in the diagnosis of perforated gastric ulcer, as the number of the cases coming to operation within 12 hours has not proportionately increased within recent years. In spite of this, however, the results have gradually improved.

Subsequent History.—The usual difficulty experienced in tracing hospital patients, and in obtaining reliable information regarding their subsequent history, prevents us giving statistical evidence of the after-results in the whole series of cases under consideration.

Taking the cases in the group operated on between 1896-1898, we find that in one—the first case operated upon in the Royal Infirmary—the patient was readmitted six months later suffering

from a subphrenic abscess from which he died. On post-mortem examination it was found that in addition to the abscess between the liver and the diaphragm there was another collection of pus in relation to the spleen, and a right-sided empyema. Another case was known to be in good health some years after the operation and had had no further symptoms of indigestion.

In the second group (1899-1903) 7 out of the 17 who recovered were reported well and free of gastric symptoms at periods varying from 2 to 12 years after operation. One man had joined the army and had been on foreign service for twelve years. Of the others no information was forthcoming, but none of them had returned for further treatment of gastric trouble.

In the third group (1904-1908) 58 recovered, and 36 of these were traced. One had good digestion a year later, but suffered occasionally from spasmodic pains in the stomach. One had an occasional feeling of dragging in the upper part of the abdomen. Three had slight indigestion 1, 4, and 7 years respectively after operation. One 7 years later suffered severely from dyspepsia. One was readmitted 2 months later with left-sided pleurisy and pneumonia. Two subsequently required to have gastro-enterostomy performed for narrowing of the pylorus. The remaining 27 had no further trouble with the stomach at periods varying from 8 months to 10 years. In 2 cases gastro-enterostomy was performed on the third day after the perforation had been closed, on account of persistent vomiting. The patients recovered, but 4 years afterwards one had occasionally some pain after food: the other had no further symptoms.

In the fourth group (1909-1913) 64 recovered. Of these 42 were in good health and had no further gastric symptoms for periods varying from some months to 5 years. Four suffered as much as ever from indigestion, one had occasional pain, one had pain and vomiting, and one had a second perforation about a year and a half later, from which he recovered. In two of the cases in which there were slight symptoms later, gastro-enterostomy had been performed.

In the complete series gastro-enterostomy was performed in 29 of the cases. In two cases it was done three days after the perforation had been closed, as there was persistent vomiting due to closure of the pylorus; in the remainder it was done as part of the initial operation, in the great majority because the closure of the perforation dangerously narrowed the outlet of the stomach. In one or two cases it was done as a precautionary or curative

measure. In three of the cases the presence of an hour-glass constriction necessitated an artificial outlet being formed from the cardiac pouch. Eight of the cases in which gastro-enterostomy was performed were fatal; in one the patient survived the operation but died three months later from tuberculous peritonitis; the remaining 21 recovered. In only three was there recorded any return of gastric symptoms. The others remained free of symptoms for periods varying from some months to 6 years. In a number of these, however, a sufficiently long period had not elapsed to determine that the cure was permanent.

Table III., which shows the mortality in each of the 5-year periods over which this inquiry extends, brings out the fact that there has been a gradually diminishing mortality—from 70 per cent. to 35 per cent. Various factors doubtless contribute to this satisfactory result—increased experience of the condition, better technique, and improvements in methods of after-treatment, *e.g.* the Fowler position, the use of saline infusions, etc.—but so far as the records before us show, the most potent factors are earlier diagnosis and more prompt operative interference.

In the great majority of the cases which rapidly proved fatal death resulted from generalised peritonitis. The post-operative complications referred to on p. 465 accounted for the fatal issue in a number of cases.

THE NUTRITIVE DISEASES OF INFANCY: A REVIEW.

By J. S. FOWLER.

THE high mortality of the first year of life is due almost entirely to the group of diseases which are commonly described as “diarrhoea and vomiting,” “marasmus,” “improper feeding,” and the like. Such cases form a very large proportion of the material of out-patient clinics of children’s hospitals and everyday practice, especially among the poorer class of the people. The management of these patients is often very difficult and the result of treatment disappointing, while from the scientific standpoint our knowledge of the pathology of the various conditions leaves a great deal to be desired. During the past half-dozen years these nutritive diseases have been studied from a new point of view by Professor Finkelstein of Berlin and his collaborators, and their work has received a great deal of attention in America, although in this country, except for passing references, it has not come into general notice. There are no doubt several reasons for this neglect. For one thing, owing to our milder climate, acute

diarrhœa and the problems of infant feeding generally are less serious difficulties than in continental countries with greater extremes of temperature. Again, like many other German scientists, Finkelstein has elaborated a rather complicated theory of his subject, to understand which, in all its ramifications, involves the study of a great deal of technical detail, and also the frequent acceptance of hypotheses which are far from proven. When to these are added the fact that the shortest complete account of his views extends to some 250 pages of not too lucid German, it is hardly surprising that his work is not widely known here.

Although the present circumstances are not such as to enhance the popularity of anything made in Germany, there is no doubt that Finkelstein's work has done a great deal to simplify our ideas as to this large class of diseases, and there is reason to think that much of it will stand the test of time. At the least it explains a good many clinical facts satisfactorily, and in the following an effort will be made to give a general outline of his teaching, avoiding technical matters, and, at the same time, attempting to apply it to our own methods and our own material.

One of the first things which strikes anyone looking through text-books of children's diseases will be the number of different digestive disorders described, and the great variety of nomenclature. Gastro-intestinal catarrh, gastritis, enteritis, acute diarrhœa, follicular enteritis, malnutrition, atrophy, cholera infantum, dysenteric diarrhœa—many others could be cited, for almost every writer has his own classification—are used to denote conditions, some of which are in practice very difficult, if not impossible, to differentiate. Finkelstein divides all these into two great classes, the *nutritional disturbances proper* and *infective gastro-enteritis*. The second of these terms is strictly limited to diseases known to be of bacterial origin, and they form an inconsiderable minority of the whole. Practically the only important type of infective gastro-enteritis that we have to deal with in Great Britain is that which is commonly called dysenteric diarrhœa. This usually sets in with high temperature, the passage of muco-sanguineous stools, and is associated with definite pathological changes—follicular ulceration—in the colon. This disease is almost certainly due to a bacterial infection, though apparently the causal organism is not the same in all localities and epidemics. Of this group—infective gastro-enteritis—therefore, no more need be said, because Finkelstein's work presents no novelty so far as these cases are concerned.

Nutritive Disturbances.—The central idea concerning this group, which comprises the great majority of all cases, is that they are purely food diseases. They are regarded as being due to a disproportion between the power of the body to deal with the ordinary food-stuffs and the amount of food-stuffs supplied. In fact, they are general diseases, not merely diseases of the alimentary canal, caused by a sort of poisoning by ordinary food. Among these nutritive disturbances we have further to recognise two main divisions: (*a*) cases in which the food has been insufficient and (*b*) cases in which too much food has been given. As before, one of these sets of cases is relatively unimportant, and the majority of cases with which we have to deal come under the second category—excess of food. In this connection it is important to remember that we are speaking of a relative, not an absolute, excess, and that what is well within the tolerance limit of one infant may be beyond the tolerance of another. Variations in tolerance depend partly on inherited constitution and partly on deviations from health due to errors in diet.

The signs of normal healthy nutrition are three: (1) *steady* gain in weight; (2) a steady temperature curve, which shows that the food is being burned up properly; and (3) a wide tolerance for alterations in quantity and quality of food. The signs of nutritive disturbance from overstepping the limits of tolerance are: (1) an irregular weight curve, showing unequal gains, losses, and stationary periods; (2) an irregular temperature curve, showing slight rises (99 to 99.5°); and (3) the so-called “paradox-reaction” to food. By the paradox-reaction is meant the fact that if to an infant whose weight has become stationary there is given an increased quantity of the food on which he has hitherto thrived fairly well, the result is an aggravation, not an improvement, of the symptoms. The weight may fall, or fever and toxic symptoms (diarrhoea and vomiting) may occur.

Up to the present we have referred to several sets of cases—to infective gastro-enteritis, to atrophy due to inadequate food and to nutritive disturbances (which may assume the form of atrophy, or of diarrhoea and vomiting) due to excess of food. The symptoms will often be identical, and in many cases the diagnosis will turn on the effect of alterations of diet. Thus it is quite impossible (apart from an accurate history) to distinguish between atrophy from excess and atrophy from defect; but in the one case an adequate diet will cure, while in the other it will make matters worse. The diagnosis, therefore, can in many cases only be made by the results of treatment.

Looking at these patients generally, it will be found that their main symptoms fall under two heads—wasting, and gastro-intestinal disturbance. Often these are combined, but as a rule one or other predominates. Recognising this clinical fact, Finkelstein divides nutritive disturbances from overstepping the limits of tolerance into two groups—*alimentary decomposition* and *alimentary intoxication*. Decomposition is characterised by progressive loss of weight, and is usually associated with a diet rich in fat and poor in sugar; intoxication is characterised by vomiting and diarrhœa, and is usually associated with a diet poor in fat but rich in sugar. Obviously it will often happen that the two conditions are combined.

To discuss first alimentary decomposition, we can divide it into three stages or grades—first, “weight disturbance” (*Bilanzstörung*), in which there is intolerance of fat, but carbohydrates can still be dealt with; second, “*dyspepsia*,” in which there is commencing intolerance of carbohydrates also; third, *decomposition*, in which the limit of tolerance for all foods sinks near to, or below, the level required for maintaining life.

The symptoms of these three stages are fairly well marked. A child suffering from weight disturbance is simply one which we would describe as thriving rather badly. He becomes soft and flabby; he ceases to gain weight; the bowels tend to be constipated, and the motions are greyish-yellow, dry, and crumbly. This “soapy” stool is practically the only one to which Finkelstein attaches any particular importance from the point of view of exact diagnosis and treatment. On inquiry it will generally be found that the infant has been fed entirely on milk, and trial will show that the paradox-reaction occurs—*i.e.* when more milk is given the weight does not rise, but falls.

As we all know, this stage may persist for a long time without getting much better or worse. Sooner or later, however, dyspeptic symptoms—vomiting and diarrhœa—will probably manifest themselves. These are purely local phenomena, due to bacterial fermentation of sugars, and may be brought about by a variety of causes, such as unduly increasing the amount of food given, some bacterial infection, or high external temperature. In this stage—*dyspepsia*—therefore, the infant has become intolerant of both fat and sugars.

It is necessary to point out now that, according to Finkelstein’s teaching, casein of cow’s milk has nothing to do with the occurrence of wasting or indigestion. To those who have been

brought up in the belief that the main difficulties connected with artificial feeding depend on the large amount of casein cow's milk contains, and who have seen all manner of efforts made to modify this quality of milk, the statement that casein presents no special difficulties must appear revolutionary. As a matter of fact, however, nearly everyone nowadays believes that in the past far too much importance has been attached to the high casein-content of cow's milk, and to this extent Finkelstein's views are generally held. With regard to another of his *dietæ*, there is much less unanimity. He holds that the order of fermentability of the sugars is lactose, dextrose, maltose; milk sugar being most fermentable, malt sugar least so, while cane sugar is intermediate. There does not appear to be much evidence of this; and although maltose is very much the fashion just now, on the ground that it is little liable to ferment, the correctness of Finkelstein's view is still open to question.

The stage of dyspepsia passes on to the stage of atrophy—true decomposition. The clinical signs of atrophy are too well known to require description. From Finkelstein's point of view, however, the following may be noted:—(1) We are all familiar with the case of the dyspeptic, poorly-nourished infant, which struggles along under careful treatment, now gaining an ounce or two, now losing, but on the whole going slowly up. Only too often, however, there is a very sudden loss of weight—perhaps 10 or 12 oz. in a couple of days; the clinical features of atrophy develop, and then the case goes steadily down hill. This sudden loss of weight in a child which is apparently gaining is called “masked decomposition,” and the deceptive gain in weight is believed to be due to retention of water in the tissues, not to a true growth. (2) The essential clinical feature of decomposition is the intolerance of food. This alone distinguishes it from atrophy due to starvation. An ordinarily adjusted diet cures the latter; it aggravates the former. (3) In decomposition the stools are usually dyspeptic (all forms of loose pathological motions are comprised under this term), and unless by restricting the amount of food we can (*a*) check the fall in body weight, and (*b*) produce normal motions, the case is practically hopeless.

The discussion of the other main group of nutritional disturbances—*alimentory intoxication*—need occupy little space. The various stages are less distinct than are those of decomposition. As the typical case of intoxication occurs under a diet containing a quantity of carbohydrate, *i.e.* a diet on which rapid gain in

weight is common, there is no equivalent to the stage of "weight disturbances." The earliest signs are slight rises of temperature and vomiting and diarrhoea. Along with these the weight becomes stationary, or, if they continue, falls. Ultimately true intoxication may set in under the clinical picture of acute diarrhoea or cholera infantum.

Before referring to the pathogenesis and treatment of these nutritive disturbances it is of interest to compare the chief features of decomposition and intoxication. The one in fact is a complete contrast to the other. In decomposition there is no loss of consciousness; the temperature is subnormal; the pulse is infrequent; the urine is normal; there is no increased production of acids, but there is diminished alkalinity of the tissues from withdrawal of bases by the bowel; the assimilating and anabolic functions are in abeyance. In intoxication consciousness is obscured; there is fever; the pulse is frequent; the urine contains albumin and sometimes sugar; there is acidosis from abnormal production of acids; the functions of dissimulation and catabolism are interfered with.

Pathology and Etiology.—These may be considered together. It is not necessary to mention any of the older hypotheses as to the pathology of atrophy, because none of them has any solid basis. Whether Finkelstein's theory will stand the test of time remains to be seen. It has been shown that in atrophy there is a withdrawal of fixed bases from the body by the bowel, and that in consequence a condition of acidosis exists. This seems to be a fairly well-established fact. The loss of alkalies is occasioned by their combination in the bowel with fat to form soaps. This apparently is the main scientific fact on which, taking also into consideration the clinical observation that milk fat is injurious in these cases of wasting, Finkelstein founds his hypothesis that decomposition is due to intolerance of fat. So far as cow's milk is concerned, difficulties alleged to be due to its high casein content are brushed aside, and its deleterious effects are ascribed to the fat and the sugar. Here, however, the further point is made that the difficulty is not with the fat as fat, or the sugar as sugar, but is due to the fact that they are presented to the digestive glands in a medium—whey—which on account of its mineral content is not favourable to the normal function of these glands. This statement is based on what are called "exchange experiments," in which the results of feeding with human whey plus cow casein and fat are compared with cow's whey plus human casein and fat. As this is the central point in Finkelstein's hypothesis of the

etiology and pathology of the conditions, his own words may be quoted: "... the non-specific (*artificially*) whey does not immediately cause disease of the bowel; it only places it in a condition which is less favourable to its function than is the case with human milk. If in a given case the intrinsic functional capacity of the bowel is sufficient to cope with the demand for nutritive material rightly, the process and results of nutrition go on just as in the case of human milk. If the bowel fails, the conditions for a pathological process of nutrition, and for the beginning of nutritive disturbance, exist."

The part played by the sugars in producing the dyspepsia, fever, and other symptoms of intoxication is not easy to understand, and still less easy to summarise in a few lines. The pyrexia, etc., are ascribed to a general disturbance of the intermediate metabolism of the sugars, which shows itself as acidosis and failure of the normal oxidation. This disturbance starts from an abnormal bacterial fermentation of the sugars in the intestine, which in its turn is associated with the abnormal medium—whey—in which the sugar is contained. Sugars, by this doctrine, are believed to have a directly pyrogenic action. Now, if it be allowed that the phenomena of acute diarrhoea are due to a general intoxication in which abnormal heat production is an important factor, it is apparent that a high external temperature, by diminishing loss of heat, will favour their occurrence. That it does so we know, but hitherto the relation of acute diarrhoea to warm summer weather has been explained on bacteriological grounds. This is denied by Finkelstein and his school, who believe that hot weather acts directly, preventing radiation, and so favouring the pyrogenic action of sugars. It seems to the present writer that although the external temperature may have, and probably has, some more direct action than we have hitherto believed, the mechanism outlined above is extremely hypothetical.

Treatment.—For use in these conditions Finkelstein has devised a milk mixture called albumin milk (*Eiweissmilch*) or, more correctly, casein-milk. It has been very largely used, and most of the reports are favourable. Its chief disadvantage is that it is rather troublesome to prepare. It is, however, not essential except in the worst cases, and these are so often hopeless whatever is done, that too much importance need not be laid on the use of albumin milk. What is really more important is the management of the milder cases on correct lines.

Albumin Milk.—To one pint and a half of milk add enough

rennet to cause curdling. After curd formation is complete strain off the whey through a bag of gauze. Pressure should not be used; the whey should be allowed to drain off for an hour. The casein is then gently rubbed three or four times through a hair sieve, three-quarters of a pint of water being gradually added. The result of this is to divide the curd very finely, and when this is accomplished there is added to the mixture of water and casein three-quarters of a pint of buttermilk. The mixture is then boiled, and during the whole time that it is being heated, until boiling takes place, it must be constantly kept in thorough agitation with an egg-beater. This is really the point at which failure is likely, for unless the stirring is thoroughly done hard masses of casein form. If the albumin milk is properly made, it ought to show no visible flocculi, and should pass readily through an ordinary teat. Albumin milk has the following composition:—casein 2·7 per cent., fat 2·27, whey salts 0·5 per cent., lactose 1·4 per cent. It is thus rich in casein, rather poor in fat, and poor both in sugar and salts. It is usual to add to it before use about 3 per cent. of carbohydrate, generally maltose (maltose-dextrin, in the form of malt extract, or one of the numerous malted cereal foods).

This mixture is given in amounts varying, to begin with, from $\frac{1}{6}$ to $\frac{1}{3}$ of the body weight *per diem*, increasing steadily until a maximum of one pint and a half is attained. Thus to a baby weighing $5\frac{1}{2}$ lb. one would give about 15 oz. *per diem* at the commencement.

In typical cases of weight disturbance with a history of exclusive feeding in cow's milk the results of treatment are very satisfactory. The amount of milk given should be diminished by about a half or a third, or skimmed milk substituted, and malted cereal be added to about 5 per cent. Under this treatment the stools lose their soapy appearance and become yellowish-brown, and the weight rises. As an alternative, buttermilk boiled with the addition of 1 oz. of sugar and $\frac{1}{2}$ oz. of flour to the pint and a half may be given. There is no doubt that it is in this condition that the proprietary milk foods so often succeed.

If dyspeptic symptoms are present, or if the infant has previously been fed on a diet containing much sugar as well as milk, the same treatment should be adopted, except that only about 1 per cent. of maltose should be added. In bad cases albumin milk should be tried.

In bad cases of atrophy success can seldom be hoped for unless breast feeding is possible. Albumin milk is the best substitute.

In alimentary fever, in which the diet has contained a quantity of lactose, this should be withdrawn; diluted milk should be given, and maltose added.

In intoxication (acute diarrhoea) all food should be withheld for twenty-four hours, and abundance of water sweetened with saccharine given. After this the infant may be given buttermilk (which contains little milk sugar), diluted milk, or albumin milk. If the child has been previously healthy it may quickly return to its previous food, though in restricted quantity. If it has previously shown signs of atrophy the problem, of course, is much more difficult. Albumin milk or breast milk offers the best chance of recovery.

In this review no attempt has been made to refer at length to Finkelstein's methods of dieting; in particular, the estimation of the caloric value of foods as a guide to quantities has been omitted. It is doubtful whether his teaching will ever, in its entirety, be adopted generally. The main points which seem likely to prove of practical use are, however, simple enough: (1) The diagnosis of nutritive disturbance depends largely on the effects of treatment, and this in its turn ought to take account not only of the symptoms, but of the history of the previous diet. (2) The group of cases in which wasting is the chief feature is often due to over-feeding with milk, and the indication is to reduce the fat and add a carbohydrate, such as starch or maltose. (3) In dyspepsia and diarrhoea the carbohydrate should be kept low, and maltose used instead of milk sugar. (4) The indigestibility of casein has been greatly overestimated.

RECENT ADVANCES IN MEDICAL SCIENCE.

NEUROLOGY.

UNDER THE CHARGE OF

EDWIN BRAMWELL, M.B., F.R.C.P.

PARASYPHILIS OF THE NERVOUS SYSTEM.

SYPHILIS in its relation to nervous diseases has of late occupied a prominent place in neurological literature. This is not surprising when one recalls the wide field which has been opened up by the discovery of the spirochæta pallida, by the introduction of the Wassermann reaction, by the establishment of the diagnostic value of the cell and albumin content of the cerebro-spinal fluid, and by the application of salvarsan in the treatment of syphilitic affections. Parasyphilis

of the nervous system regarded from the standpoint of these recent advances in knowledge forms the subject of an important paper by James McIntosh, Paul Fildes, Henry Head, and E. G. Fearnside (Brain, vol. xxxvii. pt. i. p. 1).

Fournier in 1894 formulated the conception of parasyphilis to account for cases in the production of which syphilis was an essential antecedent but which, unlike syphilitic processes generally, did not respond to antisyphilitic remedies. Although the term parasyphilis is now commonly restricted to the diseases tabes dorsalis and dementia paralytica, there is reason for believing that some cases of progressive muscular atrophy, lateral and combined sclerosis, epilepsy, and optic atrophy, are to be included in this group.

The so-called "parasyphilitic" differ from the syphilitic affections of the nervous system in three peculiar features as regards the antecedent infection, viz. :—*Firstly*, the appearance of the initial symptoms is not observed until many years after the primary sore ; *secondly*, the primary and secondary symptoms are usually extremely slight ; and, *thirdly*, the efficacy of the treatment of the syphilis in its early stages bears little or no relationship to the subsequent occurrence or non-occurrence of the parasyphilitic disease.

The exact incidence and significance of the Wassermann reaction in the syphilitic and parasyphilitic nervous diseases respectively is not as yet, according to the authors, satisfactorily determined, variations in the statistics of different observers no doubt depending on the circumstance that the recorder is often satisfied with a clinical report which is wanting in accuracy and fulness. Obviously the question is of importance, since, to take an example, it may be difficult or impossible to distinguish clinically with absolute certainty between certain cases of cerebro-spinal syphilis and dementia paralytica. The data advanced in the present paper are of special value, since the cases were all examined both clinically and serologically by the writers, who are of opinion that in approaching this problem each case must be investigated with as much care as if it were to be published separately.

As regards the Wassermann reaction in syphilis generally, the authors state that during the past fifteen months they have personally examined 372 cases in which the diagnosis of syphilitic infection was made by J. H. Sequeira and verified by continuous observation. The results were as follows :—

Primary syphilis	93	per cent.	positive.
Secondary ..	99	..	..
Tertiary ..	97	..	..
Congenital ..	100	..	..

Among 32 cases of gross nervous disease in patients in whom there was no reason to suspect syphilis there was not a single instance in which either the blood or cerebro-spinal fluid reacted positively. Of 20 cases of undoubted syphilis without obvious signs pointing to an

affection of the nervous system, in every one the serum was positive and the cerebro-spinal fluid negative. On comparing these results with other recorded observations by Altmann and Dreyfus and by Max Fraenkel, who reported a positive reaction in the cerebro-spinal fluid in secondary syphilis, the authors are prepared to admit that this may occasionally be so, since they observed a certain amount of delay in the hæmolytic of the cerebro-spinal fluid of patients in the secondary stage.

The following were the results which were obtained in cases of gross disease of the central nervous system:—

	No. of Cases	Positive reaction in	
		Serum	Cerebro-spinal Fluid.
Dementia paralytica and tabes dorsalis	17	17	17
Tabes dorsalis	24	20	22
Cerebro-spinal syphilis—			
(a) With involvement of the spinal cord	23	22	21
(b) Without involvement of the spinal cord	25	22	7

The results obtained in dementia paralytica and in tabes dorsalis are in accordance with those recorded by others, the occasional absence of a positive reaction in the last-named disease being possibly due to the long period the disease had lasted or perhaps occasionally to the severity of the antisyphilitic treatment, for in progressive cases the reaction is always positive both in the serum and cerebro-spinal fluid. On the contrary, the results in cerebro-spinal syphilis differ considerably from those reported in the literature, for the authors find that in "spinal" cases the reaction is not only constant in the cerebro-spinal fluid but is also as strong as that met with in dementia paralytica, whereas in "cerebral" cases it is much less constant and is relatively weak. The great outstanding difference between the reaction in "parasyphilis" and cerebro-spinal syphilis is, however, the prompt effect of antisyphilitic treatment on the reaction in the latter group, whereas in the former it is but little influenced.

The origin of the Wassermann reaction in the cerebro-spinal fluid is a problem which lends itself to speculation. Following the researches of Turnbull upon the subarachnoid space, and the deductions drawn from them by Fildes, the authors believe that the subarachnoid space is a closed cavity filled with a relatively stagnant cerebro-spinal fluid, which serves no lymphatic function, and is shut off from the lymphatics of the brain, cord, and roots by the endothelium which lines it. When the pia is healthy, only such substances as the endothelium is capable of sweating pass into the cerebro-spinal fluid, but

when it is the seat of a degenerative or inflammatory process "unusual substances may contaminate it as an exudate." The Wassermann substance is one of those which can only pass into the cerebro-spinal fluid when the pia is diseased. This substance, which comes from a syphilitic focus in the body, "probably represents one of the elements derived from a cell which has been specifically affected by the spirochæta pallida." In cerebro-spinal syphilis it comes, according to the authors, either from a meningeal or vascular focus, and in parasyphilis from a parasyphilitic focus. The disappearance of the Wassermann reaction in cases of cerebro-spinal syphilis under antisyphilitic remedies can be readily understood when one remembers how susceptible the gummatous process is to salvarsan therapy, which both abolishes the source of the Wassermann substance and at the same time the opportunity for its entrance. On the other hand, in parasyphilis the spirochætes are situated in the nervous tissues proper, and the reacting substance which produces the parasyphilitic lesion finds its way to the cerebro-spinal fluid by the adventitial lymphatics. The circumstance that the Wassermann reaction cannot be made negative by treatment under ordinary conditions in cases of parasyphilis is due to the fact that "antisyphilitic remedies circulating in the blood-stream cannot obtain access to those essential tissues of the nervous system which form the parasyphilitic focus."

A theory of parasyphilis is advanced by the authors. According to the view which is at present generally accepted, parasyphilis is to be regarded anatomically as a primary atrophy of nerve fibres and cells, together with a cellular infiltration of the vessel sheaths and a proliferation of neuroglia. In cerebro-spinal syphilis, on the other hand, the degeneration of nerve fibres and nerve cells which is met with is secondary to the formation of definite granulomata in the walls of the blood-vessels and consequent interference with the blood supply and, it may be, to direct pressure upon the tissues. The authors regard the "parasyphilitic" lesion as a reaction and not a degeneration, which is due to the same toxic influence which produces the gumma. In other words, "in the one case the chief reaction occurs in the nerve cells (parenchyma of the brain) and neuroglia, whilst in the other the chief reaction occurs in the meninges and vessels (interstitial tissues of the brain)." The spirochæte produces a reaction in its neighbourhood which affects both the fixed cells and the wandering cells, while in those organs which contain a specialised parenchyma a reaction may also occur in these cells with resulting degeneration followed by more or less recovery, the amount of which depends on the extent to which the specialised cells possess the power of regeneration.

With regard to the nature of the toxic action in parasyphilis, the authors follow M'Intosh and Fildes who were led by von Pirquet's conception of "Allergie" to formulate the view with regard to syphilis

that the changes produced by the syphilitic infection might take place increasingly less ("Hypoallergie") until they ceased to respond altogether and became "anergic," or that the reaction might appear more quickly and with greater violence to a smaller dose of the poison. They believe that tertiary and "parasyphilitic" phenomena are instances of the opposite condition ("Hyperallergie"), the difference between the gummatous and the parasyphilitic lesion being that the parts affected by the latter have no power of regeneration. The simultaneous occurrence of gummatous meningitis and *tabes dorsalis* in the same patient is explicable by this theory, as is the course of cases of *tabes* which remain stationary for many years.

The central nervous system is probably rendered hypersensitive by spirochaetes or their toxins which pass up the nerves from the skin and mucous membranes during the secondary stage, the headache and lassitude which so often occur at this time possibly representing clinically the period of sensitisation.

Finally, "parasyphilis is a clinical conception which comprises the manifestations of a series of diseased states. From the pathological point of view the term is inadmissible. These states depend on the reaction of hypersensitised tissues to the spirochaete or its toxin, and this reaction is as truly syphilitic as the production of gummata."

"The difference between the consequences of the tertiary and of the 'parasyphilitic' process lies in the nature of the tissues participating in the reaction. In the one case the connective tissue is capable of repair, and the focus is readily reached by the remedial agents. In the case of 'parasyphilis,' reaction of the essential nerve-elements leads to their death, and antisyphilitic remedies cannot readily reach the spirochaete."

E. B.

SURGERY.

UNDER THE CHARGE OF

J. W. STRUTHERS, F.R.C.S., AND D. P. D. WILKIE, F.R.C.S.

INTERNAL DERANGEMENTS OF THE KNEE.

IN a paper read before the Clinical Congress of Surgeons of North America, held in London in July, Robert Jones deals with the various derangements commonly met with in the knee-joint (*Surg. General, and Obstet.*, October 1914). His observations were based on an experience of over 1000 cases in which he has explored the knee-joint in search of mechanical derangements. In his experience by far the most common of these is injury to the internal semilunar meniscus. The internal meniscus suffers about eight times more frequently than the external. This should be borne in mind, as lesions of the internal semilunar at times give rise to symptoms on the outer side of the joint. In nearly all cases the cartilage is displaced inwards. When a pro-

trusion is felt from the outside, it is due to hæmorrhage following a tear, a localised bruising of tissue, or a trickling of cartilage accompanied by effusion, which gives rise to an irregular outline of the articular margin.

In many cases there is no locking of the joint at the time of the primary injury, although this symptom may be present with recurrences. The internal lateral ligament is usually strained or torn at the same time. To reduce the displacement Jones recommends that the knee be fully flexed and rotated inwards. At the count of three the patient is told forcibly to extend his own knee while the surgeon makes pressure from without. The patient knows definitely and at once whether reduction has been effected or not. Great stress is laid on the importance of keeping the knee at absolute rest for four or five weeks, during which time the muscles are massaged and the patient is encouraged to contract his quadriceps without moving the joint. "Unfortunately many of us become obsessed with the alleged advantages of a hurried convalescence and the illusory fears of adhesions. They are only snares for the unwary." By taking these precautions a large proportion of cases may be permanently cured and recurrence be avoided.

In recurrent cases, when seen after the effusion has disappeared, there is often pain on pressure over the internal lateral ligament and above the tibial margin over the anterior horn of the semilunar. On slight hyperextension of the knee pain is often felt in front of the joint. Locking is the most definite and reliable symptom, and unless it occurs an element of doubt must always remain. The patient is always definitely clear that the sensation does not change from place to place.

Jones holds decided views on the subject of operation. He refuses to operate at the first displacement, as many cases recover permanently under appropriate treatment. He does not encourage operation when the recurrence is painless and is never followed by effusion in the joint. He strongly advocates operation when the recurrence is sometimes followed by acute symptoms, and in all recurrent cases in athletes, or in men whose occupation demands a secure joint. He prefers to operate with the knee flexed over the end of the table, and now uses a transverse incision, commencing just behind the ligament of the patella and traversing slightly above the tibial border. It is very necessary to remove the loose portion of the cartilage if the rest is firmly attached. Walking may be commenced in from ten to fourteen days, the joint being protected for another week. With reference to other derangements, loose bodies should always be removed after they have been located and fixed, the incision being made in front or behind, from the popliteal space, according to the position of the loose body.

Exostoses in proximity to the joint may give rise to symptoms simulating lesions of the semilunar cartilages by slipping of muscles or tendons over them. The removal of the exostosis is called for.

Ruptures of the crucial ligaments are readily diagnosed if their functions are borne in mind. The anterior crucial is tense when the knee is fully extended and prevents the tibia from being displaced forwards on the femur. The posterior is tense in complete flexion and prevents the tibia being displaced backwards. If the tibia cannot be moved in an abnormal direction, the crucial ligaments are not injured. If the joint is rested for several weeks an excellent recovery usually results and operation is not necessary.

In fracture of the tibial spines the most constant sign is an obstruction to full extension. The block is recognised to be a definite bony obstruction, and is quite different from the locking from a dislocated semilunar or ripping of synovial fringe. This injury may call for removal of the spine.

UNSATISFACTORY RESULTS FOLLOWING OPERATIONS UPON THE BILIARY TRACT.

In the experience of I. M. T. Finney (*Canada Lancet*, August 1914), a greater proportion of unsatisfactory results follow operations upon the biliary tract than in any other class of abdominal operations, except possibly gastro-enterostomy. This somewhat pessimistic conclusion is to some extent modified by the statement that by "unsatisfactory results" he means to include that group of cases in which the surgeon has failed to do what he set out to do. "The patient may be fairly well satisfied, indeed not infrequently is; he does not know any better, but nevertheless from the surgeon's standpoint the result remains imperfect." The writer's attitude, therefore, appears to be rather an artistic than a practical one, and a great deal depends upon the standard of success which the surgeon sets before himself. The author has analysed some 572 cases of gall-bladder disease operated upon in the Johns Hopkins Hospital up to 1st January 1914, and of these he has been able to trace 366. Of these, 89.3 per cent. were well after varying lengths of time, and 10.6 per cent. were "not well." The mortality from all causes was 8.3 per cent. Carcinoma was not included in the inquiry. The last 100 cases showed much more satisfactory results in every way than the first 100, and this has been the experience of a large number of writers quoted by Finney. This is probably due to greater skill, more accurate diagnosis and earlier operation. There is probably little to choose from in the mortality rate between cholecystostomy and cholecystectomy. The author emphasises the point, which is so often overlooked by practitioners, that the presence or absence of jaundice is of little aid in diagnosis in many cases, as slight jaundice accompanies many other abdominal

conditions, and jaundice may be absent in serious gall-bladder affections.

The author admits the difficulty of removing all the stones in some cases, particularly when they are in the common bile duct, and he quotes cases of a kind familiar to most surgeons in which a stone is felt on palpating the common duct and yet cannot be found when the duct is opened and explored. In some cases it has passed into the duodenum; in others it may have receded into the hepatic duct. Another common experience is referred to, that of finding one or more stones in the drainage tube some days after an operation at which it was confidently believed that all had been removed. This raises the question of the formation of fresh stones, and of the occurrence of this the author has no doubt; he proves it from some of his own as well as from recorded cases. At the same time he admits that it is rare, and that in the vast majority of cases in which stones have been found and removed at subsequent operations, they have in all probability not re-formed, but been overlooked. Such authorities as Riedel and Czerny go so far as to say that they have never seen a true recurrence.

The importance of drawing a distinction between the class of affections of the biliary tract associated with the presence of gall-stones and the class which is not, is duly emphasised, but the author does not appear to lay sufficient stress on the part played by cholecystitis in the production of symptoms. He also expresses legitimate doubt as to the frequency of chronic pancreatitis as an explanation of the patient's symptoms when gall-stones are not found at operation.

It is not advisable to remove the gall-bladder where there is evidence of stricture of the common duct or of the ampulla, and the operation of repairing the duct is one of great technical difficulty. The gall-bladder should be utilised from drainage with the possibility of a subsequent cholecystenterostomy.

Persistent biliary fistula is one of the commonest of the unsatisfactory results. The cause is almost invariably some obstruction of the cystic or common duct, usually in the form of a stone, the removal of which is promptly followed by closure.

Among the more immediate causes of unsatisfactory results are mentioned acute dilatation of the stomach, and hæmorrhage in deeply jaundiced cases. The latter occurred only in a fraction of 1 per cent., and the coagulation test was not found to be a reliable index as to the danger. The administration of calcium lactate was of doubtful value, but fresh rabbit serum apparently gave better results.

OBSTETRICS AND GYNECOLOGY.

UNDER THE CHARGE OF

A. H. F. BARBOUR, M.D., AND J. W. BALLANTYNE, M.D.

PUERPERAL INFECTION.

COMPARATIVELY few articles appear nowadays in periodical medical literature bearing on the subject of puerperal infection; but this scarcity is not to be ascribed to a final and satisfactory solution of all the problems which have been associated therewith; indeed Dr. J. R. Goodall of Montreal (*Canadian Med. Assoc. Journ.*, iv, 589, July 1914) points out that obstetrical opinion is in a very fluid condition at present, and that there is a marked tendency to abandon the more heroic methods of attack for milder forms of treatment and even for abstention from all forms of interference whatever. Dr. Goodall further indicates that the changed view-point affects not only the treatment of cases in which infection has occurred, but also that of cases in which, so far, only the risk of infection taking place is present. Prominent in this second group are the instances of membranous retention following upon expulsion of the placenta. The recent literature dealing with this matter was discussed in these pages no longer ago than September (*vide* p. 256) and need not be returned to now; but it will be remembered that there existed an extraordinary divergence of opinion as to the best method of treatment with a view to the prevention of septic absorption, and that whilst some authorities counselled what was practically a policy of non-interference under all circumstances, others took more or less active measures according as a large or a small part of the membranes was retained. Dr. Goodall, it is to be noted, is in favour of non-interference; he refrains from any form of treatment which entails invasion of the uterine cavity; but he does introduce treatment and is not content with a policy of *laissez-aller*. His management of such a case consists in sitting the patient up in bed, removing all vulvar pads and perineal binders, placing the patient on a sterile *pique*, and administering continued small doses of combined ergot and quinine, or repeated small doses of pituitrin; sometimes he puts an ice-cap on the fundus uteri. In another group of circumstances, retention of a portion of the placenta, Dr. Goodall pursues a plan of "masterful inactivity unless hæmorrhage enters as a marked feature" into the case; when there is hæmorrhage and the patient's condition is good he removes the piece of afterbirth immediately, but when she is weak or exhausted he packs the uterine cavity with gauze and in twenty-four hours takes out the packing and the placental fragment with it if hæmorrhage still continues.

More important questions arise and more divergent plans of treatment are employed when puerperal infection has actually occurred.

Curettage, with a sharp or a blunt instrument, digital scraping, intra-uterine douching: which is it to be?—or is it to be nothing? Dr. Goodall is, on the whole, strongly conservative in his management of puerperal infection. When there is chill and fever on the fourth day, a large and tender uterus, a soft and patulous cervix, and a cessation of the lochia, it is not necessary to conceive that there must necessarily be retention in the uterus of some of the products of conception; the treatment called for is neither curettage with a blunt nor much less with a sharp instrument; even the finger is not free from risk, and the plan to be preferred, according to Dr. Goodall, is to ensure drainage and to sustain the strength. Not even the fetidity of the case, indicating the presence of saprophytic organisms, is a sign that we may curette with safety, for these are generally instances of mixed infection, and, besides, there is always the risk of the presence of thrombo-phlebitis, when of course any handling of the uterus may set loose a clot to work mischief. The cases of infection, in which the symptoms already named (boggy uterus, soft patulous cervix, fever and chill on third or fourth day) are complicated by the presence of hæmorrhage and of anæmia resulting therefrom and from the toxic hæmolysis, should be dealt with in the same way in most instances: there is no need for, but only harm from, uterine exploration (under anæsthesia), douching, or packing; but in a few instances Dr. Goodall adopted the plan of gently drawing down the cervix and of packing the uterus with plain or iodoform gauze for twenty-four hours. The author admits that hæmorrhage is the one symptom which forces him occasionally to invade the infected uterus. He is opposed to intra-uterine douches even in the cases with fever and a copious fetid, *café au lait* coloured lochia and much mucus; he thinks the douche causes increased absorption of bacteria and toxins, chills, and sometimes death. The douche fluid may very easily be driven through into the peritoneum; further, whilst the bactericidal power of such douches is very problematical, their chemical influence on the tissues is real enough. Finally, the conclusion is expressed that neither the anti-streptococcic serum nor vaccines are of much value. The safe lines of treatment are the encouragement of drainage by the sitting posture in bed, by cleansing vaginal douches under low pressure, by giving the patient water to drink in large quantity and a sustaining and nutritious diet, and by the use of stimulants if necessary; in a sentence—drain and the strength maintain.

In another Canadian medical journal (*The University of Toronto Medical Bulletin*, ii. 14, 14th May 1914) an individual case of puerperal streptococcal septicæmia is discussed by Dr. B. P. Watson. The patient was admitted to the Toronto General Hospital on the sixth day of the puerperium after a labour which had not been interfered with, but after a pregnancy in the latter part of which she had been nursing a child with a discharging ear. On the third day there had been a

rigor and fever had continued; the abdomen was distended but the uterus was not tender; there was free vaginal discharge, fetid and blood-stained; both the cervix and the perineum were slightly torn and sloughy; the uterus was larger and softer than normal, and the os was patulous. Both the uterine and cervical secretions gave a pure growth of streptococcus, and streptococci were also found in the blood. The treatment consisted in vaginal douching with perchloride of mercury (1 in 2000) followed by sterile water, and then the cervix was exposed through a speculum, and the uterus was irrigated with a solution containing a drachm of tincture of iodine to a pint each of alcohol and of water. The douche was not repeated, for the discharge quickly lost its color and lessened in amount. The woman was kept in the Fowler position for drainage, and was given 5 grains of quinine and half an ounce of whisky every four hours. Twenty-five c.c. of polyvalent anti-streptococcic serum were given each day for three days, but no result seemed to follow from it. The patient drank freely of water, and the bowels were kept freely open by magnesium sulphate and soap and water enemata. Under this and no other treatment the patient recovered, and it is noticeable that improvement set in soon after a local exudate appeared in the left broad ligament, perhaps causing auto-vaccination. An important matter from the standpoint of prognosis was the occurrence of recovery although streptococci were found in the blood for eleven days. It is interesting to note that in certain details Dr. Watson's case supports the general lines of treatment laid down by Dr. Goodall; it shows, for instance, the value of the Fowler position, the inefficacy of the serum injection, and the usefulness of the vaginal douching and of the copious administration of water along with stimulants. It may be safely concluded that the tendency to abandon intra-uterine measures in puerperal infections is correct, although possibly ere long a note of warning may have to be sounded to prevent a too complete cessation of all local treatment.

RETROFLEXION OF THE PREGNANT UTERUS.

Dr. O. J. Rapin (*Revue méd. de la Suisse Romande*, xxxiv, 462, July 1914) deals not so much with ordinary cases of retroflexion of the gravid uterus which if recognised early and treated promptly (by replacement and pessary) seldom give rise to serious trouble, as with those other cases in which from the existence of adhesions and consequent fixation and incarceration, abortion threatens. What is the best treatment to employ in these complicated and dangerous abortions? Dr. Rapin points out that a purely expectant line of management may be followed. Under these circumstances, if the uterine contractions increase and the cavity of the organ empties itself more or less completely of its contents the obstetrician need not necessarily interfere; if, however, the emptying be incomplete he may require to scrape out

the interior. After the abortion and consequent diminution in size of the uterus it may be possible to replace it and keep in it in position with a pessary ; but in many instances this happy result will not follow, and the uterus will remain displaced, too large in size, and the site of endometritis and of other troubles. Then it may be necessary to operate at a later date in order to set the uterus free. The purely expectant method, therefore, can hardly be relied upon to give a good permanent result. A second plan, that of expectancy with certain auxiliary means, may be adopted. The object of this plan is to lessen the uterine pains and to gain time for the attainment of mobility by the fixed organ. Whilst, however, it is true that as the pregnancy goes on the adhesions may stretch or relax, it is seldom safe to trust to this, for the bladder difficulties may increase, pyelonephritis may be superadded, and even a fatal termination may be reached. A third method of treatment is to put the patient under the influence of narcotics and at intervals to try to replace the uterus whilst the woman is still narcotised ; this plan, however, entails a long period of time, and in the end it may require to be supplemented by operation. Dr. Rapin next points out that if these plans are all ineffectual it has generally been considered that the only other line of treatment must be the induction of abortion in order to save the life of the mother : but he thinks, and rightly, that this is hardly an ideal aim or end to have in view, and he pleads that the progress which has been achieved in abdominal surgery ought to make possible another and a better plan. It is well to lay it down as axiomatic that the life of the foetus should be sacrificed only when there is no other means of saving the mother. The abdomen may be opened, as Dubrisay and Jeannin pointed out in 1903, the uterus may be replaced by the hand, and intra-peritoneal shortening of the round ligaments may be done : but as early as 1895 Jacobs had already treated ten cases of retroflexion of the gravid uterus by laparotomy and hysteropexy. Dr. Rapin refers to quite a number of cases reported by Ferfasser, Marchener, Manchet, Jacobs, Mairs, Cristofoletti, and Gouilloud in which after laparotomy the pregnancy went on to the full term and a living child was born, whilst the mother was at the same time cured of her displacement and of the troubles associated with it. Further, ventrofixation is in the author's opinion to be preferred to intra- or extra-abdominal shortening of the round ligaments : and he closes his article with a full description of the details of a case in which, in 1911, he opened the abdomen, replaced the retroflexed uterus, and attached it to the anterior abdominal wall. Although abortion was threatening at the time of the laparotomy, the pregnancy continued, a living child was born at term, and later it was found that the mother's uterus was in its normal position. Further, another normal labour occurred later, showing that the ventrofixation had not prevented conception, had not shortened

pregnancy, and had not complicated confinement. It is without doubt along lines such as these indicated by Rapin that progress in the management of the anomalies of pregnancy must proceed; it is always a less high ideal to sacrifice the child's life for the mother's than to endeavour to save both; indeed there is a time coming in which the word ideal will not be applied to it at all, but quite another term.

J. W. B.

THERAPEUTICS.

UNDER THE CHARGE OF

JOHN EASON, M.D., F.R.C.P.

PELLAGRA.

Those who have had much experience in the treatment of pellagrins agree on one point, namely, that in the milder cases the symptoms will almost always disappear in a relatively short time if the patients are kept in hospital on a liberal mixed diet, with plenty of fresh meat.

The difficulty is that many pellagrins are mentally defective and refuse to comply, and it is necessary to use all available psychotherapeutic methods in order to succeed with the dietetic treatment.

Cases in which there is mild diarrhoea should not be treated with a reduction in the quantity of the food, as metabolic studies have shown that the assimilation of food is unimpaired in this condition.

Constipation is favourably influenced by an increase of fats, such as olive oil, butter, cod-liver oil, etc., or by the continued administration of castor-oil.

Advanced cases of pellagra, and especially the so-called typhoid pellagra, are often unimproved by any available treatment, and end fatally in a shorter or longer period of time.

Turning to the efficacy of drug treatment, Lombroso advocated the administration of arsenic in the form of Fowler's solution as a specific for the disease. His extremely optimistic attitude appears to be shared by few, although this drug is employed also by some in America.

Carodylates and salvarsan have also been tried. Possibly arsenic in any form may be beneficial in many cases of pellagra associated with a loss of body weight and malnutrition.

Sodium chloride was also used by Lombroso for the treatment of pellagra in children especially. Very little can be said in favour of this or the dozens of other drugs suggested at different times for the treatment of this disease.

Another phase of the treatment concerns the well-known relation between pellagrous erythema and exposure to sunlight. Patients have

to be cautioned to keep out of bright sunlight as much as possible. Hydrotherapy is also a useful addition to the treatment.

Transfer of the patient to a cooler climate seems to be followed by an improvement in the symptoms, but it is now known that pellagra has developed in persons living in northern climates such as Canada and Great Britain.

Owing to the lack of knowledge regarding the etiology of the disease, the treatment may be summarised as symptomatic and empirical, diet and rest figuring most prominently in the procedures.

Carl Voegtlin (*Journ. Amer. Med. Assoc.*, 26th September 1914) offers a few suggestions in regard to the possible explanation of the beneficial effect of a liberal diet on the course of the disease. Surveying the clinical and pathological aspects of pellagra, he arrives at the conclusion that it is a state of chronic intoxication, the agents at work being for the present unknown. He believes that toxic substances exist in certain vegetable foods—not necessarily decomposition products—which if consumed for a lengthy period may produce an injurious action. This hypothesis does not rule out the possibility that a dietary deficiency may also play a rôle. Voegtlin's views are based on extensive feeding experiments on mice, rats, and monkeys, to which further reference can scarcely be made in a therapeutic abstract.

It may, however, be said that Drs. Myers and Voegtlin (*Public Health Reports*, 1914) found relatively large amounts of soluble aluminium compounds in such vegetables as produced toxic symptoms. Voegtlin thinks this furnishes at least the basis for an understanding of the effect of a change of diet. In a liberal mixed diet the absolute amount of vegetable products consumed will be considerably reduced. Hence, also, the possibility of an injurious action of the vegetable food on the body, and particularly the irritant action on the gastrointestinal canal, will be reduced.

Meat is known to be easily digested by pellagrins, leaving practically no unassimilated residue in the intestine. The unassimilated residue of vegetable diets is voluminous.

Apart from the differences in digestibility and food value in the old sense, foods have to be considered from some newer standpoint.

Proteins have to be studied by their content of amino-acids. Some proteins are deficient in certain amino-acids essential for growth and maintenance. Most of the proteins derived from animal sources, with the exception of gelatin, seem to be more suitable for human nutrition, as they contain all the necessary components in the right proportions. Some of the vegetable proteins, on the other hand, seem to be deficient in this respect. It can hardly be denied that the majority of those who contract pellagra have lived for years on a vegetable diet mainly.

There are also to be considered the substances present in small

quantities in animal and vegetable foods known as vitamins. Meals are relatively rich in these, while polished rice is extremely poor in vitamins. Funk has advanced the hypothesis that pellagra is a disease due to lack of some vitamins in food. No experimental or clinical proof has yet been advanced to support the hypothesis so far as it applies to pellagra.

Voegtlin, in replying to the discussion, criticised the evidence of the Thompson-M'Fadden pellagra commission, and maintained that just as much weight of argument is on the side of the nutrition theory as on the side of the infection theory.

PHARMACOLOGY OF SODIUM TARTRATE.

In 1912 Underhill reported experiments which showed that 1 gramme per kilo. injected subcutaneously into animals produced marked tubular nephritis. Further observation by the same writer and others showed that the lesions were mainly confined to the epithelium of the convoluted tubules, and to a less extent of the loops of Henle. Administration of 3.5 grammes by the mouth had a similar action.

Pearce and Ringer (*Journ. of Med. Research*, 1913, xxix. 57) produced nephritis in dogs by means of sodium tartrate, which was given subcutaneously, intraperitoneally, and by the mouth. Complete suppression of urine, or diminished secretion with albumin and casts, was observed. The histological changes in the kidney consisted of necrosis of the convoluted tubules, fatty changes in the loop of Henle, and in the collecting tubules. According to these observers the glomeruli were also involved, although these were not affected in all the animals. Previous observers did not find glomerular changes.

Post (*Journ. Amer. Med. Assoc.*, 21st February 1914) carried out a series of tests with tartrate on the human subject. He failed to notice any deleterious effect even in nephritis, with doses of from 8-24 grammes of Rochelle salt. William Salant (*ibid.*, 26th September 1914) confirms the result of previous experiments on animals after doses of 0.4-0.8 gramme of the neutral salt given to rabbits. In one series of experiments, death resulted in 70 per cent. of the animals receiving 0.4 gramme per kilo. The weight of the kidney was increased 50-100 per cent. The animals died in from 6-10 days.

Muscle and nerve symptoms were observed. Forced movements, ataxia, paralysis and convulsions developed several days after receiving tartrate. Cabbage-fed animals were more resistant than those fed with oats; on the other hand, carrot-fed rabbits which received doses of 2.5 grammes per kilo. had no symptoms except an occasional trace of albumen.

The effect is always less when the salt is given by the mouth. Five grammes per kilo. by the mouth was always fatal.

Experiments show that its effect on the circulation and the isolated heart is that of a cardiac depressant.

CHRONIC BRIGHT'S DISEASE.

Hare (*Therapeut. Gaz.*, September 1914, p. 614) believes that the older theories concerning the avoidance of all meat and the ingestion of large quantities of milk are to a great extent erroneous, although they are still largely followed. That ordinary red meat taken in moderation is harmful is very doubtful. He is inclined to think that in many instances the removal of red meat from the diet list interferes with the patient's nutrition, diminishes his vital resistance, and in no way exerts a beneficial influence. Red meats, if they are fresh, are no more harmful than white.

The institution of a rigid milk diet is also an error. Hare enlarges on this subject, apparently under the impression that this practice is a common one in the treatment of those chronic forms of disease. It may be questioned if this practice is at all common, although special circumstances may occasionally dictate a temporary resort to an exclusive milk diet. Such attempts are usually very brief-lived, for one very important reason, viz. patients suffering from chronic diseases will not submit to it for any prolonged period.

Hare states there can be no objection whatever to the use of carbohydrates, and many of the starchy foods contain enough vegetable albumin to provide a diet which will be adequate. He concludes that such a diet must therefore be better for the patient than the albuminous diet afforded by milk. Apart from the fact that this conclusion is one which is not invariably borne out by clinical experience, it is one which has an insufficient theoretical basis.

Hare objects to the use of skimmed milk except for instances in which digestion of fat is unsatisfactory. In many respects Hare's views show him to be an advocate of the Von Noorden régime for chronic Bright's disease. Von Noorden's method of dieting such cases was to insist more than anything else on the purity and freshness of the food given, so that no strain should be thrown on the kidneys in eliminating toxins. Again, red meat was regarded by him as preferable to white meat, as the former contained less material capable of being metabolised into uric acid, which is eliminated with greater difficulty than urea.

Blood-letting for the treatment of uremia is approved of only if there is also evidence of mechanical obstruction of the venous system as shown by dilatation of the right side of the heart, marked congestion of the venous system, and cyanosis. Hare condemns the general use of Basham's mixture.

TETANUS.

W. H. Park and Mathias Nicoll (*Journ. Amer. Med. Assoc.*, 18th July 1914) have conducted a series of experiments on the curative

value of the intra-spinal administration of tetanus antitoxin. They have also treated a small number of cases by this method. From their experiments on guinea-pigs they concluded that the intra-spinal method was absolutely superior to the intravenous method. Full protocols are given of their experiments on approximately fifty animals. Only those animals receiving the antitoxin in the spine were able to survive. This result was all the more striking since the amount of antitoxin given them was only a fractioned part of that given to the animals treated by the intravenous method.

They publish records of four consecutive clinical cases of tetanus in which an intra-spinal injection of antitoxin was given. All the patients recovered. In two of these the incubation period was 9 days, in one 10, and in a fourth it was unknown. Three of the cases were in children.

On experimental and clinical grounds Park and Nicoll made the following recommendation:—In every case strongly suspected of being tetanus, from three to five thousand units of tetanus antitoxin should be given at the first possible moment intra-spinally, slowly by gravity, and always, if possible, under an anæsthetic. In order to ensure its thorough dissemination throughout the spinal meninges the antitoxin should be diluted, if necessary, to a volume of from 3 to 10 c.c. or more, according to the patient's age. It is probably advisable to repeat the injection in 24 hours. A dose of 10,000 or 15,000 units should be given into a vein at the same time. Three or four days later a similar dose may be given simultaneously. They do not believe there is any advantage in giving larger doses. Intraneural injections seem to them to be an uncertain and roundabout way of reaching the diseased nerve-centres, and the intra-spinal method is in any case simpler.

J. E.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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CATARACT OPERATION.

Two interesting papers have recently appeared in the *Ophthalmic Review* dealing with the subject of the most suitable mode of operation for senile cataract. That of Fergus (Glasgow) is essentially practical, and deals chiefly with the methods adopted by himself at the operation and in preparation for it. He is one of those who will, apparently, admit that no harm of any sort or kind can befall an eye which is kept aseptic, and that every ill under the sun may be traced to organismal infection. That view has an excellent influence upon the operator in urging upon him always the strictest and most careful precautions and in forcing him

to be his own most severe critic in any case of failure. Still Fergus seems to go too far when he regards as "almost amusing" the discussion of the best form of knife, of repositor, of incision in the capsule, and so on, since failure or success "is not a matter of cutlery but of sepsis." But surely, for example, the form of knife which gives the cleanest cut and the minimum of bruising to the tissue is a matter worthy of due consideration, even from the strictly aseptic point of view, for such a knife will destroy fewest cells and give least opportunity for invasion. So that when he says "A cataract operation, therefore, does not depend upon the method of operating, it does not in the least depend upon the form of knife used. . . . It does not depend upon the making or not making of an iridectomy," etc., we must take the statement to be rather relatively true than absolutely accurate; assuming, in the first place, that his somewhat cryptic phrasing implies that *the success of* an operation does not depend, etc. Fergus gives some sound advice as to the conduct of the operation, but in the midst of it he makes statements whose character is so sweeping, one might say so reckless, as to deprive his really wise advice of much of its weight. A writer diminishes sadly the value of his paper when he commits himself to such a statement as: "In the treatment of conjunctival conditions the use of nitrate of silver has been almost entirely given up, and that quite properly, for *all that nitrate of silver did* was to destroy the conjunctival epithelium and allow the micro-organisms to get a freer access to the denuded tissues" (the italics are ours). Fergus seems attracted by the idea of extraction in the capsule, but finds the objections which may be urged against it such that he is not disposed to abandon present methods.

The paper of Maddox (Bournemouth) is well worthy of study. In regard to the choice of the particular operations best adapted to the individual case he puts forward five considerations, namely, safety, visual results, beauty of eye, brevity of procedure, and fewness of operative interferences; and these five points he discusses with much insight. He deals with conjunctival flaps and bridges, corneal and conjunctival sutures, the propriety of preliminary iridectomy, of simple and combined extractions, lavage, post-operative astigmatism, and other matters, all touched upon with that clearness of thought and that delicacy of expression which are characteristic of the author. He discusses further with particular care (contrast Fergus's paper) the best form of speculum for use either in presence of an assistant or without one. His conclusions are fourfold, namely, (1) give to cases ideal for it the benefit of simple extraction; (2) in all other cases prefer a preliminary iridectomy; (3) failing both (1) and (2) perform combined extraction; (4) reserve intracapsulars for immature cataracts when ideal facilities present themselves.

TREPHINING OPERATION.

At the recent Congress in London two lectures were delivered (among others on various surgical subjects) which bear upon the operation generally known as trephining the sclerotic. That by Collins (London) regards the matter chiefly from the standpoint of pathology, and is of considerable value. His opinion, at one time, was that the cystoid sear, which used to be the object aimed at by some surgeons, involved the presence of an entanglement of iris in the cicatrix, but he has now seen reason to modify this view. He discusses his subject under four headings. (1) The establishment of a permanent gap in the endothelium of Descemet's membrane is the most essential feature in the operation. He considers that the piece removed by the trephine should include a complete disc of Descemet's membrane and not encroach upon the ligamentum pectinatum, which in many cases of glaucoma has the root of the iris in immediate contact with it. He has found that the line of junction between clear cornea and opaque sclerotic on the surface of the globe is 1 mm. internal to the position where Descemet's membrane commences to split up into the fibres of the ligamentum pectinatum, so that if the 1.5 mm. trephine has its centre over the margin of the cornea a complete disc of Descemet's membrane will be found on the posterior surface of the piece removed. (2) Just as a wound of the iris, if aseptic and kept bathed in aqueous humour, does not tend to close, so a wound of the cornea if kept apart for a time will, in similar circumstances, remain permanently open, and that is exactly what happens in the case of a trephine aperture. (3) The importance of a good conjunctival flap is great, as helping very materially to keep the trephine wound aseptic, and therefore to prevent its healing. (4) A further point in favour of a conjunctival flap is that it prevents the epithelium from growing down along the walls of the tunnel cut by the trephine.

In Elliot's paper, also read at the Congress, the theme is chiefly the mode of operation, with points in the technique: he deals also with the difficult matter of the late infections. These have occurred in the practice of several surgeons, and it seems as though this operation were specially exposed to this particular risk.

W. G. S.

NEW BOOKS.

The Brain in Health and Disease. By J. S. BOLTON, M.D., F.R.C.P.
Pp. xiv. + 479. With 99 Illustrations. London: Ed. Arnold.
1914. Price 18s. net.

DR. SHAW BOLTON'S book undoubtedly marks an epoch in the study of mental disease. It is the first real attempt to place this subject on a satisfactory basis; in other words, to offer a pathological explanation

of symptoms. Whether this attempt will be altogether successful cannot at present be determined, because the investigations on which it is based are so laborious, and are to some extent so dependent on individual interpretation, that time will necessarily elapse before his conclusions can be either verified or rejected. These conclusions are so important and far-reaching that it is to be hoped further similar investigations will soon be forthcoming.

The method of the researches which have led Dr. Bolton to his weighty conclusions is a careful microscopical examination of the cortex in various typical regions of the brain. The thicknesses of the cortical layers in these regions are very carefully measured, and the resultant averages compared. It is hardly necessary to point out that this is a work which not only requires great care in fixing, cutting, and staining the sections, but also involves an immense amount of time in the mere process of enumeration. As the depth of the layers is, to some extent, dependent on individual judgment, it is quite to be expected that other observers may come to a different conclusion to that reached by Dr. Bolton.

The book is based on work extending over the last 18 years. It opens with a study of the general histology and development of the cerebral cortex, and records the author's conclusions from an examination of 36 cases. These conclusions may be stated in his own words: "The essential physical basis of mental disease consists, on the one hand, in an imperfect development of the cell laminae of the cortex which is of the nature of a true sub-involution, and on the other, in degrees of decrease of the cell laminae which are of the nature of a true involution or dissolution, since such decrease in depth takes place in the converse order to that in which the cell laminae are developed in the process of normal growth" (p. 37). This thesis is elaborated later in the book and figures given to support it. From these it appears that the second cortical lamina is the latest to evolve, that it is most developed in the human brain, and that its superior development is most marked in the prefrontal convolutions. Its function is chiefly the associative and elaborative processes which constitute the highest mental operations.

The classification of insanity adopted as a result of these investigations is very simple in its main outlines. From the quotation given above it will be concluded that it has two divisions, that of sub-evolution or amentia, and that of involution or dementia. In the one the development of the cortical laminae never reaches the normal: in the other it does so, but undergoes pathological regression.

The book is written in a clear style, is very well illustrated, and, in view of its important claims, is well worthy of the most careful study.

The Occupational Diseases: Their Causation, Symptoms, Treatment, and Prevention. By W. GILMAN THOMPSON, M.D., Professor of Medicine, Cornell University Medical College in New York City. Pp. xxvi. + 724. With 118 Illustrations. New York and London: D. Appleton & Co. 1914. Price 25s. net.

THIS work, the first of its kind published in America, treats of the subject in seven parts. Four appendices and an index complete the volume. The history of the subject, classification, and general pathology and etiology are dealt with in the first part. In it the institution of industrial museums of safety in fourteen of the larger continental cities of Europe is pointed out, and a short description with illustrations is given of the museums established in Berlin and in Vienna. A description and illustration are also given of the hospital and clinic at Milan specially devoted to occupational diseases. The value of the compulsory reporting of cases is illustrated by British experience in regard to lead poisoning. The extreme importance of accuracy in the reporting of occupational disease is insisted on by the author, who points out the need for inquiry not only into the working environment of the patient, but also into his home environment and habits. A copy of the author's special history card for the investigation of cases of occupational disease is printed in the text. In Part II. the subjects of prophylaxis and treatment are gone into. In Part III. diseases due to irritant substances are dealt with under six subdivisions, viz. diseases due to (1) toxic metals and their compounds; (2) toxic gases and fumes; (3) toxic fluids; (4) irritant dusts and fibres; (5) germs, including ankylostomiasis as well as diseases such as anthrax due to micro-organisms; (6) miscellaneous irritants such as linseed oil, rubber, etc. In Part IV. diseases due to harmful environment are discussed, *e.g.* caisson disease, etc. Part V. is devoted to a description of the effects of special occupational diseases on the blood, nerves, skin, etc.; and in Part VI. the influence of alcoholism and syphilis, and of the abuse of tobacco, are discussed in relation to occupational diseases. Miscellaneous occupational diseases not already dealt with are described in connection with various trade processes in Part VII.

The work is written in an attractive and interesting style by a physician of wide clinical experience in the special subject with which he deals; and suitable acknowledgment is made to British and Continental European authorities. The numerous illustrations form a special feature of the book and are of material assistance to the readers.

The work is one that can be recommended not only to the physician interested in occupational diseases, but also to the larger class of the general public engaged in industrial pursuits. The employer will find in it sound advice for the protection of his employees; and the workpeople are shown how much depends on

their intelligent co-operation to attain the desired result, viz. the prevention of much of the disease incidental to employment. The volume will also appeal to the non-medical official such as the factory inspector and the sanitary inspector, whose daily work brings them into intimate contact with the conditions under which work is carried on in the factory and workshop, and also in the home.

Tuberculosis of the Bones and Joints in Children. By JOHN FRASER, Assistant-Surgeon, Royal Hospital for Sick Children, Edinburgh. Pp. 352. With 215 Illustrations. London: Adam & Charles Black. 1914.

SINCE König published his memoir on this subject about twenty-five years ago and established the tuberculous origin of the maladies formerly known as scrofulous caries and white swelling of joints, important advances have been made, and among those who have contributed to those advances the author of this volume specially deserves honourable mention. Fortunate in working under Mr. Stiles, and also in the possession of valuable pathological material derived from the operating theatre of the Royal Hospital for Sick Children, Mr. Fraser has made a reputation for himself as an able investigator and as an author of undoubted originality. He has made notable departures from the beaten track, and in all of these he furnishes evidence for his conclusions.

The subject-matter is so specialised as not to lend itself to a review in the ordinary sense of the term. Concerning the etiology of the tuberculous affections of bones and joints, the most important point raised is the relative sphere of the human and of the bovine tubercle bacillus. The author claims from his own observations that no less than 60 per cent. of his cases owed their origin to infections with the bovine bacillus, and he wishes to correlate this with two other facts, an infected milk supply, and a young age incidence of the lesions under consideration. The lymphatic glands, cervical and mesenteric, are infected in the first instance, and from this source the bones and joints are provided with an abundant supply of the infecting agent.

In urging the importance of the alimentary infection, the author lays stress on the feeble resistance offered by the mesenteric glands of a child compared to those of an adult, and thinks there can be no doubt that the blood-stream is the main, if not the only, route by which the infection is conveyed from these to the bones and joints, the latter, in the author's opinion, being more susceptible than the bones to infection by tuberculous disease. We agree that the influence of trauma is of much greater importance in the spread of the disease than upon its original development.

The volume is well furnished and profusely illustrated; it represents

a valuable addition to the "Edinburgh Medical Series," edited by Dr. Comrie and published by Adam & Charles Black.

The Bacteriological Examination of Food and Water. By WILLIAM G. SAVAGE, B.Sc., M.D., D.P.H. Pp. x. + 173. With 16 Illustrations. Cambridge Public Health Series. Cambridge: At the University Press. 1914. Price 7s. 6d. net.

THE subject-matter of this book is excellent, and the aim of the author to treat of such subjects as the bacteriology of water, air, foods, etc., more adequately than is done in the ordinary text-books of bacteriology, is fully carried out. Only on one subject does there seem to be room for criticism. In the section on the examination of water no emphasis is laid on the importance of the inspection of the surroundings of the source of supply before giving an opinion on the safety of a water.

In view of Dr. Savage's other excellent works on the subjects treated in this book, this publication would seem to be unnecessary, except for filling up a gap in a series.

Gas Poisoning in Mining and other Industries. By JOHN GLAISTER, M.D., F.R.S.E., Professor of Forensic Medicine and Public Health in Glasgow University; and DAVID DALE LOGAN, M.D., Surgeon to the Coltness Iron Works, Newmains, etc. Pp. vi. + 471. With Plans, Coloured Plates, and 36 other Illustrations. Edinburgh: E. & S. Livingstone. 1914. Price 10s. 6d. net.

IN their volume issued under the above title Professor Glaister and Dr. Logan present to the reader the views of many authors upon poisoning by carbon monoxide and other forms of poisoning arising in mining and other industries in which gases are used for power, etc. They have been able from their own extensive experience to emphasise points which are now being recognised as of great practical importance in the prevention of accidents.

In their chapter upon ventilation of mines emphasis is laid upon the need for greater attention to renewal of air at the working face. Chapter IV. deals with actual explosions in coal mines, and includes a tabular statement of the principal colliery explosions in Britain from 1877 to 1913. The important part coal-dust plays in explosions is duly emphasised.

Much space is devoted to the symptomatology of carbon monoxide poisoning, and there is some redundancy in several of the chapters dealing with this part of the subject. Stress is laid upon after-effects of CO poisoning, and the importance of the subject as it affects the Workmen's Compensation Act is indicated.

A chapter is devoted to a description of the methods of detecting carbon monoxide in the body and in the air or gases. The chapter dealing with apparatus for rescue work in mines is full, and the figures illustrating the apparatus and their use are lucid.

In the Appendix is given a description of the explosion in 1909 at West Stanley Colliery, Durham. Two plans of the workings are incorporated. There is a full bibliography and index.

While recommending the book especially to medical practitioners in the large industrial centres, and to those who are interested in the welfare of coal miners and such as may be subjected at work to poisonous gases, we think that future editions would benefit from a rearrangement and condensation of certain portions.

Arteriosclerosis: A Consideration of the Prolongation of Life and Efficiency after Forty. By LOUIS FAUGERES BISHOP, A.M., M.D. Pp. x. + 383. With 12 Plates and 25 Figures. London: Henry Frowde and Hodder & Stoughton. 1914. Price 10s. 6d. net

THE author's thesis is that arteriosclerosis is a disease which results from a special sensitisation of the sufferer to one or more of the proteins which are found in his dietary. The obvious deduction is that the diet should contain as few proteins as possible, in order that the chance of the patient's ingesting the one to which he is sensitive should be minimised, and the form of proteid which is chiefly commended is cheese. The hypothesis is unsupported by any cogent evidence, and more than one-third of the book consists of quotations which, whilst they swell the size of the volume, contribute little or nothing to the theory which it aims at setting forth.

The Principles of Pathologic Histology. By FRANK B. MALLORY, M.D. Pp. 677. With 683 Illustrations. Philadelphia and London: W. B. Saunders Co. 1914. Price 24s. net.

THE title expresses the general scheme of this book. It is the principles underlying the different histological appearances that the author lays stress upon when considering these appearances themselves. The book is a mine of information, and throughout it the originality of the author is evident, and the information conveyed has been gathered first hand from the actual tissues.

The arrangement of the subject-matter follows the usual practice. Part I. deals with general pathological histology, including inflammation, retrograde processes, special injurious agents and the lesions they produce, and tumours. Part II. is devoted to special pathological histology, and includes the changes seen in the different systems. This arrangement unavoidably leads to repetition in order to connect the general changes to the special tissues.

The classification of the tumours according to a relatively small

number of cell types is simple and practical, and might with advantage be more generally adopted. It is to be noticed with interest that under lymphoblastoma the author puts lymphoma, lymphosarcoma, pseudoleukemia, lymphatic leukemia, and Hodgkin's disease, the last being described as a scirrhus variety. Such a grouping will not at present meet with universal agreement. At p. 31 and throughout the book the author says that if the parenchymatous cells of a tissue or organ are destroyed they are not replaced by fibrous tissue unless there has also been damage to the fibroblasts of the part. While this may be true up to a point, it is a difficult thesis to maintain, and it is evident that the author finds this difficulty in several places. In necrosis in tuberculosis, vascular thrombosis from endothelial accumulation is said to explain the whole process, a view which seems hardly capable of explaining all the appearances. It would have been of advantage if rather more information had been given on arteriosclerosis, which is dismissed rather briefly. The processes concerned in sclerosis (cirrhosis) of the liver are rationally discussed and well summed up on p. 513, and the old-time division of "coarse" and "fine" cirrhosis, etc., criticised and very properly dismissed.

Although in the preface the author rightly states that "in pathology the lesions themselves are the original sources of information," it would have been useful, to those at least wishing to obtain other men's ideas, if a bibliography of the more important papers had been appended. The illustrations are an excellent feature of the book.

This work is to be warmly recommended to all those working at or interested in pathology, for, as well as the store of information it contains, it is pregnant with original and sound ideas.

Diseases of the Stomach. By CHARLES G. STOCKMAN, M.D. Pp. xxxvi. + 774. With 65 Illustrations. New York and London: D. Appleton & Co. 1914.

THIS book contains a lucid, systematic, and up-to-date description of diseased conditions of the stomach. The author deals with his subject from a broad basis and writes from very considerable experience. Throughout the book he shows very clearly how stomach symptoms may only be indications of diseased processes in other organs of the body.

The first part of the book deals with anatomy, physiology, methods of examination, etc., and includes excellent descriptions of gastric analysis and radiographic investigations. Probably the best chapter in the book is that dealing with the difficult subject of dyspepsia. Here the author gives valuable advice on how to regard gastric symptoms in relation to disturbances in other organs. A very full account of peptic ulcer is given, and the depressing subject of gastric carcinoma is exhaustively described. The various special tests

for cancer of the stomach are detailed, but the author, with due caution refrains from expressing any opinion as to the diagnostic value of any of them alone. In a short account of cyclic vomiting the various theories as to the causation of the condition are reviewed, the author's opinion being that the condition is probably neurotic in origin. The treatment of this difficult condition is only briefly described.

We have formed a most favourable impression of this book, and consider it specially useful to all general practitioners who have so constantly to deal with patients presenting gastric symptoms.

A Treatise on Clinical Medicine. By WILLIAM HANNA THOMSON, M.D., LL.D. Pp. 668. Philadelphia and London: W. B. Saunders Co. 1914. Price 21s. net.

THIS work scarcely justifies its title. It might equally well be described as a systematic text-book written in a somewhat slipshod manner. The absence of illustrations detracts much from its value as a clinical guide. The discussion of treatment, while revealing a wide practical experience, is rather dogmatic in tone, and one is inclined to envy the writer's faith in many of the drugs recommended. Many of the effects ascribed to the action of certain drugs, such as camphor and digitalis, are at least very doubtful. There is a great deal of loose construction in the writing, rendering some sentences misleading and others quite unintelligible. While the practising physician may acquire some useful hints from the writer's experience, the book is not suitable for students.

A Practical Handbook of the Tropical Diseases of Asia and Africa. By H. C. LAMBERT, M.D. Pp. 324. With 88 Illustrations. London: Charles Griffin & Co. 1914. Price 8s. 6d. net.

IN this work the author embodies the wide experience he has gained by prolonged residence in various parts of the tropics. Though it cannot be regarded as a book of reference or as a standard text-book, it contains much practical information, and will be found useful by medical men proceeding to the tropics.

A striking feature is the adoption of an alphabetical arrangement by which it is claimed that the diagnosis and treatment of the various diseases is shown at a glance. This arrangement is not altogether a happy one. For example, the information regarding the diagnosis of different diseases furnished under the alphabetical arrangement is generally meagre, and it is more or less by accident that fuller, and generally exact, methods are to be found under the headings of "Aids to Diagnosis," "Bacteriological Methods," or "Protozoology." The result is annoying and confusing.

In the Therapeutic Index are described methods of treatment

which the author has found satisfactory. A notable defect is that many well-known and valuable methods of treatment, including hypertonie infusion in cholera and the use of emetine in threatened liver abscess and chronic dysentery, are not mentioned.

The coloured illustrations are good. Without usurping the functions of an art critic, it is perhaps allowable to point out that the figure illustrations (drawn by the author) cannot be classed as successful "studies"; it might even be suggested that more satisfactory results would have been attained by the use of a hand-camera.

Surgery: Its Principles and Practice, for Students and Practitioners. By ASTLEY PASTON COOPER ASHHURST, A.B., M.D., F.R.C.S. Pp. ix. + 1141. With 1039 Illustrations. London: Henry Kimpton. 1914. Price, cloth, 28s. net; $\frac{1}{4}$ Persian gilt top, 32s. net.

THE author has written this text-book mainly to provide the student with a fundamental education in the principles and practice of surgery. The style is attractive, and important points are emphasised. The more common ailments are discussed in detail, and the rarer conditions briefly mentioned. The illustrations are copious and interesting, though the value of many of them is diminished by their reproduction on too small a scale.

It is noteworthy that the author recommends the treatment of fractures by fixation rather than by massage and movement; but, though one is inclined to hold different opinions on points such as this, it must be granted that the author presents his own views in a concise, practical, and readable form.

NEW EDITIONS.

Psychoanalysis: Its Theories and Practical Application. By A. A. BRILL, Ph.B., M.D. Second Edition. Philadelphia and London: W. B. Saunders Co. 1914. Price 13s. net.

DR. BRILL'S book is a summary of Freud's psychology, and it should prove a valuable introduction to those who wish to study this extremely difficult subject. That no one of our innumerable thoughts need ever pass into nothingness, but that each and every of them may affect our feelings and our conduct after perhaps many years, necessarily makes the determination of the thought or thoughts causal for symptoms we may now possess a hard task. This task is one not to be undertaken lightly, and if the methods which Freud has devised are to be investigated in such a way that a real opinion can be formed about them, it is to be hoped that the author's advice will be taken, that no one should attempt to employ these methods who has not had

a considerable training in psychiatry and neurology. Further, anyone who takes up this investigation in neuropaths must be prepared to discuss, without reserve, sexuality, as the term is understood in English. It is true that the author denies this in his preface. "To us the term is very broad: it really comprises the whole love-life of the individual." When, however, we come to the discussion of cases it is gross sexuality that is presented to us. This need not surprise us. We are all more or less suppressing gross sexuality; social life would be impossible if we were not. The sexual thoughts are powerful, and some compromise must be obtained between the thoughts and their suppression. Hence *double entendres* are common, and in any prolonged analysis they will be met with, and if the analysis is pushed the gross sexual thought will be arrived at. This might occur in anyone however normal. The neuropath, introspective, over-sensitive, over-scrupulous, will consider, in a way that the normal will not, that what he has to suppress must be disgraceful, that it must mean that he is debased beyond other men, and he may well fall into states of depression and develop symptoms which may remain after his conscious mind has forgotten all about the thoughts which caused them. No doubt an analysis will assist many of these people if it is accompanied by explanations, by sympathy, and by the promise of cure as soon as the matter is fully understood. The follower of Freud would say it was the analysis that did good, but it is impossible to conceive of any analysis without copious explanations. All writers on the subject agree that sympathy is necessary to get the facts at all, and it is notorious that the hope of cure when the matter is fully understood is constantly held out. We have here, then, three powerful factors for cure common to many other psycho-therapeutic systems: they are all employed for a very long time, and it may well be that they have as much to do with the cures as has the actual analysis itself.

It is unfortunately true that this method has its failures. It is now known that there are patients whose cases have been analysed by the most skilful of Freudians and yet they are not any better; and there are some who have been so distressed to perceive the way in which their minds have worked that they have become worse.

On the whole, it seems that while we have by these methods obtained a key which will unlock the secrets of many of the symptoms of the neuroses, we have not got what is claimed by Dr. Brill, viz. a method of treating the neuroses as entities and not symptomatically.

The book is well written, and presents as lucid a description of an obscure subject as we are likely to get for some time. The cases quoted are interesting to read, which is in marked contrast to so much case reporting in general medical literature. This may be due partly to the fact that they are in themselves interesting stories, but it is due also to the author's decided gifts for making his characters live and

for leaving out unessentials. After reading the book, however, one is left with a feeling that though we have been presented with what purports to be a complete and finished philosophy, so far, at any rate as the sane mind, the non-delusional mind, is concerned, there are still gaps to be filled in. Difficulties are bridged over too easily, contradictions are invariably made to appear not to be so, till one is reminded of the saying of the heterodox homeopathist, who said that the *dilutus* "*similia similibus curantur*" means that the symptoms caused by the drug and the disease should be like one another, or else unlike.

There is a good index and a very helpful glossary of psychological terms.

Surgical Handbook. By FRANCIS M. CAIRD and CHARLES W. CATHCART. Sixteenth Edition. Pp. xv. + 364. With 208 Illustrations. London: Charles Griffin & Co., Ltd. 1914. Price 8s. 6d. net.

IN noticing a work which has reached its sixteenth edition it is only necessary to indicate in what the new issue differs from its predecessors. In the present case the principal changes are concerned with the subjects of anaesthesia, the treatment of fractures and of spinal curies. The whole text has been revised and many of the older illustrations have been replaced by new ones.

Medical Diagnosis. By JAMES M. ANDERS, M.D., Ph.D., LL.D., and L. NAPOLEON BOSTON, A.M., M.D. Second Edition. Pp. 1248. With 500 Illustrations. Philadelphia and London: W. B. Saunders Co. 1914. Price 24s. net.

THIS book may be cordially recommended as an up-to-date exposition of the art of medical diagnosis. One of its chief merits lies in the fact that, while modern scientific aids to diagnosis receive adequate recognition, the pre-eminent importance of a thorough physical examination as the only sound basis of accurate diagnosis is strongly and repeatedly emphasised. With the rapid progress of laboratory methods, this truth tends to receive insufficient attention.

The physical examination of patients is fully and carefully described. We are glad to see that auscultatory percussion is strongly advocated as an accurate method of investigation. It is a method which might with advantage be more generally used.

Regarding modern scientific aids to diagnosis, the value of the X-rays is shown under each system. A section reviews shortly but lucidly the principles of the electrocardiograph, and there is a useful chapter dealing with the more important problems of arterial pressure. The use of the gastroscope is fully described, and coloured illustrations of various appearances are given. Certain subjects, such as Cammidge's

reaction and the opsonic index, perhaps receive more consideration than their value warrants.

It is surprising to find no mention throughout the book of any of the valuable tests helping us to estimate the functioning power of the kidneys. The illustrations are numerous and attain a high level of excellence.

Practical Therapeutics. By DANIEL M. HOYT. Second Edition. Pp. 426. With 17 Illustrations. London: Henry Kimpton; Glasgow: Alexander Stenhouse. 1914. Price 21s. net.

THIS book divides itself naturally into two parts. In the first part the author concerns himself with presenting a brief summary of the pharmacological actions of drugs, and of their value and their limitations in the treatment of disease.

The usefulness of this part suffers from the rigorous condensation necessarily adopted, and the author's confusing classification does little to assist the reader. American fluid measure is used—16 oz. to the pint instead of 20 as in England. The numerous prescriptions that are given throughout the volume are good and useful, but greater care might well have been taken either to use, in the writing of these prescriptions, Latin altogether or English altogether, and to exclude rigorously such expressions as "Extract of Hyoseyami." Several well-executed cardiograms illustrating the actions of certain drugs appear throughout the book. The second portion is mostly taken up with a descriptive enumeration of proprietary drugs and preparations, and as the names of the manufacturers are given in the majority of instances, it is interesting and instructive to note how greatly the manufacture and sale of proprietary synthetic remedies is in the hands of the Teuton.

A full index of preparations of drugs completes the work, but as these preparations belong to the U.S. Pharmacopœia, they possess for us, on this side, mainly an academic interest.

A Text-Book of Insanity. By C. A. MERCIER, M.D. Second Edition. Pp. xx.+348. London: George Allen and Unwin. 1914. Price 7s. 6d. net.

IT is not to be wondered at that Dr. Mercier's *Text-Book of Insanity* has reached a second edition. It is not only a popular book, but it has sound reasons for being so. Its very unorthodoxy is refreshing and highly stimulating, because it induces what Dr. Mercier so ardently pleads for—such clear thinking as an admittedly difficult subject permits of. He has applied his own powers of clear thought to the subject, and the result is well worth careful study.

As is well known, Dr. Mercier lays great stress on a study of the normal mind preceding that of the abnormal, and in this edition of his

book he has enlarged the scope of his chapter on the mind. He has succeeded in giving a clear outline of what he considers it requisite to know. His well-known views as to the critical value of conduct in estimating mental disease are still a prominent feature in his treatment of that part of his book, though he laments that these views are yet lacking adherents except himself. But this fact will undoubtedly not disturb his equanimity, and he may console himself with the hope that, in, say, 50 years, his views may be regarded with the same veneration as that now accorded to the German school of thought. This is well known to have always met with his strong disapproval.

NOTES ON BOOKS.

To the reader who prefers his light literature to have a medical flavour, *Queer Patients*, by M. Oston, M.D. (Murray & Evenden, Ltd.), will prove acceptable. Our own tastes do not run in this direction, but we confess that, from a sense of duty, we have read this volume and have found it very amusing. That we are not alone in this is evidenced by the fact that it is a second edition that calls for this notice.

Eye, Ear, Nose, and Throat (Practical Medicine Series, 1914, edited by Wood, Andrews, and Ballenger, the Year-Book Publishers, price £1.50)—a volume of more or less interesting papers by American and German authors dealing with eye, ear, nose, and throat work for the year 1913. It is intended chiefly for general practitioners whose time may be limited and who have not access to the journals on these specialties.

Pharmacopœia of the Hospital for Diseases of the Throat, Nose, and Ear (Golden Square), seventh edition, edited by Charles A. Parker, F.R.C.S.E., and T. Jefferson Faulder, M.B., B.C.(Cantab.), F.R.C.S. (J. & A. Churchill, 1914, price 2s. 6d.), an extremely useful book for the consulting-room table. Older formulæ have been superseded by newer and simpler remedies.

TRANSACTIONS, PERIODICAL PUBLICATIONS, ETC.—We have again pleasure in drawing the attention of our readers to the *Collected Papers by the Staff of St. Mary's Hospital Mayo Clinic* (W. B. Saunders Co.). The number of contributors to the work of the year 1913 is greater than ever, and the value of the contributions is of the high standard to which we have become accustomed in this publication. There is no better way of keeping in touch with progressive surgery than by studying the successive issues of these collected papers.

Another American publication which is always full of interest, although of a more personal kind, is *The Clinics of John B. Murphy*, of which Nos. 2 and 3 of the third volume are now before us.

In the *Transactions of the College of Physicians of Philadelphia* (vol. xxxv., third series, 1913) we have a series of papers dealing with the practical as well as the scientific side of clinical medicine.

The *Reports of St. Thomas' Hospital* (vol. xli., 1913) is almost entirely statistical, but it shows with what scrupulous care the work of the hospital is recorded and tabulated. Whether the labour involved in compiling such elaborate tables is justified by the practical results is an open question, but there is no doubt the work is well done and reliable.

ANALYTICAL REPORTS.

ACROSYL.

(THE ACROSYL CO., LONDON.)

For a considerable number of years past, preparations containing cresol dissolved in liquid soap have taken an important place among the antiseptic agents used in surgical and gynecological work. Being freely soluble in water, they can readily be prepared in any strength required, and in addition to their high bactericidal properties they have the advantage of removing grease from the skin and dried discharges, mucus and blood from the parts around a wound. One of the principal drawbacks to this class of antiseptic agents hitherto has been that they have been irregular in their composition, and when cresols which are not chemically pure are used in their composition the lotion is liable to be very irritating to the skin, and in some patients even dilute solutions produce a painful eczematous condition.

Some years ago one of the principal manufacturers of carbolic acid in this country took up this subject, and after prolonged and careful experimentation he has succeeded in evolving a preparation from which all the acrid irritating substances have been eliminated, and which contains only chemically pure cresols of the highest grade, and neutral soap. We have from time to time had the opportunity of testing this product in the various stages through which it has passed, and we have found it increasingly satisfactory. For over a year now we have employed it regularly in its present form and have found that it is constant in its composition and much less irritating to the hands and to the skin of the patient than the proprietary preparations we formerly employed.

It has now been placed on the market under the trade name of "Acrosyl," and is sold in $\frac{1}{4}$ lb., $\frac{1}{2}$ lb., 1 lb., and 5 lb. bottles at a price which is considerably less than the foreign-made preparations.

"TABLOID" HEXAMINE.

(BURROUGHS WELLCOME & Co.)

Of medicinal products the supply of which has been affected by the present war, Hexamethylenetetramine is of considerable importance. It is interesting therefore to note from advance copies of the *British Pharmacopœia* that this uric acid solvent and antiseptic is to be added to our official medicines under the name of "Hexamine." Burroughs Wellcome & Co. are now manufacturing hexamethylenetetramine in England, and issuing it as "Tabloid" Hexamine, grains 3 and grains 5. This is a decided triumph for the British fine chemical

industry. This "Tabloid" product conforms with the tests and characters of the B. P. 1914. Hexamine is a powerful urinary antiseptic, diuretic, and solvent of uric acid concretions. In meningitis, hexamethylenetetramine taken orally has been found to appear in the cerebro-spinal fluid in 20 to 60 minutes, and is stated to be beneficial. It has also been used in the treatment of pellagra and acute poliomyelitis.

"TABLET" SODIUM ACID PHOSPHATE.

(BURROUGHS WELLCOME & CO.)

In cystitis and in infective diseases of the genito-urinary tract the administration of sodium acid phosphate is recommended to cause or increase the acidity of the urine, a condition favourable to the activity of hexamine. For this purpose "Tablet" Sodium Acid Phosphate 10 grains is now issued. The pyuria of cystitis, the early stages of gonorrhoea, and other bacillurias are well treated by these means.

TABLOID COLCHICINE AND NUX VOMICA (COMPOUND).

(BURROUGHS WELLCOME & CO.)

Messrs. Burroughs Wellcome & Co. have added to their list a tablet preparation of colchicine in which nux vomica is included to counteract any depressing effect the colchicine may have. This preparation should prove useful in the treatment of acute and sub-acute gout.

BOOKS RECEIVED.

BATTLE, W. H. The Acute Abdomen. Second Edition	(Constable & Co.) 10s. 6d.
CARLESS, A. Rose and Carless's Manual of Surgery. Ninth Edition	(Lippincott, Trenchard & Co.) 21s.
CLARKE, E. A Brief Review of the Work of Doctors	(Haldimont, Francis & Co.) —
CUNNINGHAM'S Manual of Practical Anatomy. Vol. II. Sixth Edition	(Livingstone, Black & White, & Sons, Ltd.) 10s. 6d.
DAN, K. Handbook of Obstetrics	(Charles H. Kelly) —
ELLISON, E. L. Practical Bacteriology	(J. B. Lippincott & Co.) 6s.
EPISCOPAL Hospital, Philadelphia, Medical and Surgical Reports. Vol. II. (W. J. Doran)	—
GALLICHAN, W. M. The Soldiers' English and French Conversation Book	(T. Werner Laurie) 7d.
GRANT, M. F. Field Ambulance Notes	(Forster, Groom & Co.) 2s.
KELYNACK, T. N. Human Derelicts	(Charles H. Kelly) 5s.
KENNEDY, J. M. Nietzsche: The Mind that Used the Way	(T. Werner Laurie) 1s.
MANN, J. D., and W. A. BREND. Forensic Medicine and Toxicology. Fifth Edition	(C. Griffin & Co., Ltd.) 18s.
NOEMAN, A. C. Practical Medical Electricity	(C. Griffin & Co., Ltd.) 5s.
TOMES, C. S. A Manual of Dental Anatomy. Seventh Edition	(J. & A. Churchill) 15s.
WOODWARD, A. S. Medical Nursing	(Edward Arnold) 4s. 6d.

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